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ABSTRACT

This report contains profiles of computer-based writing programs at 49 colleges which were originally submitted for empirical assessment by a 3-year project sponsored by the Fund for the Improvement of Postsecondary Education and the City University of New York. The profiles, representing two-year and four-year, public and private, rural and urban, and small and large colleges, offer advice on topics such as: (1) setting up, expanding, or modifying writing programs with a computer component; (2) how much technical information to give novices in word processing and when to give it; (3) setting up laboratories, the arrangement of furniture, and the scheduling of courses; and (4) using the computer in the English class with a variety of target populations--basic writing students, learning disabled students, students in freshman composition and literature classes, and upper-level students. The descriptions are listed in alphabetical order by the name of the college. Each begins with a summary statement and provides the names and addresses of authors. (GL)

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Computers and College Writing

Selected College Profiles

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A publication of the National Project on Computers and College Writing
The Instructional Resource Center and the Office of Academic Computing
The City University of New York

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A Project fo the Fund for the Improvement of Post Secondary Education and the City University of New York

Computers and College Writing

Selected College Profiles

Nora Eisenberg, Editor

A publication of the National Project on Computers and College Writing
The Instructional Resource Center and the Office of Academic Computing
The City University of New York

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INTRODUCTION

This monograph grows out of the National Project for Computers and College Writing. With the support of the Fund for the Improvement of Post Secondary Education, The City University of New York, in 1987 initiated the National Project in response to a growing sense among faculty and administrators that computer technology offered dramatic new means for the teaching of writing on college campuses. However, hampering this enthusiasm was the growing concern that the fate of computer technology would follow that of other technologies such as television, movie projectors and cassette recorders. Because of a lack of systematic training, teachers never adequately integrated these technologies into classroom methodology, and equipment, after a brief flash in the classroom, began to collect dust on storeroom shelves. We saw that very little practical material helped classroom teachers who wanted to transform computer hardware and software into instructional realities. Other than the technical manuals that accompany software packages, no guidance and specifically, no teacher-produced materials, enabled teachers to integrate programs effectively into classroom use.

The City University of New York's Office of Academic Computing and the Office of Academic Affairs' Instructional Resource Center approached FIPSE with a three-year project that proposed to assess empirically the outcomes of outstanding computer based writing programs around the country. The Project proposed to analyze the differences in attitude and performance between students exposed to computer based writing and comparable students engaged in traditional writing classes. The results of this assessment could demonstrate possible classroom computer uses for colleges and universities. We proposed selecting six project sites, with a national conference at the end of the third year.

FIPSE agreed to sponsor the Project. A call for proposals went to institutions of higher education around the nation in the fall of 1987, and the response far exceeded expectations. Of the more than eighty-five proposals received, most qualified as outstanding programs. Clearly, many campuses had developed exceptional approaches to computer methodology. Because of funding limitations, the Project's staff and advisory board were forced to make difficult choices from the list of interested campuses. Fortunately, Apple Computer provided funding to expand the site list from six to fifteen. The sites represent the mainstream of American higher education, from private four-year institutions to two-year public community colleges.

Although we could not invite all of the institutions who sent proposals to become participants in the Project, we nonetheless wanted to make the descriptions of these programs available to the higher education community. Hence this book. In it, colleges and universities over the country reveal the shape and structure of computer-based writing programs for freshmen. The volume relates a transformation, rare but potent in history--the transformation of skeptics into zealots. True, many colleges reveal themselves as early admirers of computer technology. But in large part, the stories that emerge in the descriptions here are stories of initial distrust, even contempt: computers belonged in banks and big businesses, in engineering classrooms or physics laboratories, or so many thought. The business of writing instruction was the humanistic business--the development of the human mind through writing and reading, an enterprise that put us on the other side of the world from thinking machines. In our world, computers foretold isolated and tedious drill and practice sessions that would replace classroom interchange: an administrator's dream of cheap instruction would become an instructor's nightmare.

The descriptions of what went on and what goes on at the colleges represented here offer quite a different scenario from the one that many of us imagined in terror only a few years ago. Writing teachers found in computers a means for advancing and in some ways enhancing humanistic goals. The colleges whose descriptions appear here are two-year and four-year, public and private, rural and urban, small and large. But what they share and what they relate most consistently and emphatically is a commitment to the computer's use and value in meeting human needs. What emerges here are English programs that make use of word processing and that find in this new technique a means for fostering a collaborative approach to writing instruction. The revelation that computers enhance collaborative work, whether by accident or intention, agrees nicely with the recent literature on writing instruction. Even when computer laboratories are set up so that students sit separated from one another in little carols, we find students hurdling the barriers. Sometimes the teachers orchestrate this; often it just happens. The screen is so big, the writing so apparent, that students can not help but put in their two cents on a nearby writer's creation. Networking the machines helps this interchange as do laboratories with workstations in clusters; but even in laboratories organized in restricting rows or in isolated units up against a wall, students are leaning over to comment, buddying up, forming little writing communities. The instructor roams, conferencing and coaching. What emerges in description after description is an all around exhilaration: the teachers are happier, the students are happier, and the sense of achievement soars. People are communicating more about the matter of writing.

The concerns that remain about the value of the computer in the writing classroom do not detract from the positive outlooks of both instructors and the students. But the concerns are there. Can we, for example, combine both pencil and paper methods and computer technology in the same classroom? Are there advantages of one over the other? Does fascination with the computer detract from the business of writing? How are the utilities of word processing--spell checkers, formatting, style checks--affecting the work of revision? Are students writing better? How does the word-processed paper influence the teacher's perception of good or bad writing? How do collaborative and process writing, enhanced by the computer, affect the notions of authorship and assessment? And how does the introduction of this technology change the role of instruction and curriculum in the classroom? What additional resources do we need?

In a sense this monograph complements Holdstein's 1987 book: *On Composition and Computers** written for the Modern Language Association, and tries to answer some of the questions raised there. *Computers and College Writing* provides concrete examples from programs across the country. But we note that the assessment of writing programs, particularly those containing computer components, is still in its infancy.

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* Holdstein, D. *On Composition and Computers*. The Modern Language Association: New York, 1987.

As computer technology becomes increasingly more sophisticated and its use more widespread in the classroom, our conception of what constitutes text will undoubtedly change. The National Task Force on Writing Instruction has already produced a position paper suggesting a redefinition of text that includes the writing produced with the help of electronic bulletin boards--hypermedia that includes words, numbers, sounds, mathematical or musical notation, still and moving images. Electronic mail facilitates the development of what Helen Schwartz, the Task Force panel chair calls the "socially constructed discourse community."* Students already use this technology in the classroom: they write research papers while browsing through library collections on their screens, and retrieve files from mainframe computers that interact with the machine on their desk. Anthropologists like Goody, remind us, that all societies have systems of writing that have an impact on culture.** They also remind us that changes in technology profoundly affect social organization. The change is not, however, unidirectional, as Cole and Keyssar point out; social organization also affects the incorporation or dismissal of new technology.*** Certainly we are witnessing all of these facets of change in the classroom. The possibilities are indeed endless.

In the pages that follow here we have for the most part anecdotal offerings, testimonies, if you will, to the effect that, with the right guidance from the instructor, students tend to cooperate more when they write on the computer, like it more, write more, and revise more. Many colleagues say that students seem to feel better about writing and about themselves as writers. Many colleagues think, too, that students seem to write better with word processing. It is this last piece that remains to be proven and that we look ahead to the National Project's finding for some fuller and firmer answer.

With or without this experimental confirmation, we suspect, computers are here to stay in our English classrooms. Used well, computers seem to allow us to do what we want to do in our writing programs with greater ease and joy. The descriptions here will help the many colleagues interested in setting up or expanding or modifying writing programs with a computer component. The descriptions offer advice on how much technical information to give novices in word processing and when to give it, the problems encountered in setting up laboratories, the arrangement of furniture and the scheduling of courses. They offer advice on using the computer in the English class with all sorts of populations--basic writing students, learning disabled students, students in freshman composition and literature classes, upper-level students. They offer a diversity of experiences and opinions; reading through the descriptions, we find guidance for avoiding problems and pitfalls as well as for reaching successes and solutions.

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* Schwartz, H. Panel Chair, *Computers and College Writing: Blueprint for Progress*. (National Panel on Writing Instruction: Draft Report), 1989.

** Goody, J. "The Interface Between the Written and the Oral". *Cambridge Studies in Literacy, Family, Culture and the State*. Cambridge University Press: New York, 1986.
Goody, J. *The Logic of Writing and the Organization of Society*. Cambridge University Press: New York, 1987.

*** Cole M. and Keyssar, H. *The Concept of Literacy in Print and Film*. Communications Programs. University of California, San Diego, 1982.

The descriptions are listed in simple alphabetical order. Each begins with a summary statement that will help you use the volume as a resource. The names and addresses of authors appear at the end of each description. We trust colleagues will make use of these to contact one another for additional thinking, experiences, and information.

We at the National Project are very excited about the collegiality evident across the nation, as teachers share with each other how computers help us do our job better. The aim of the Project is to propagate a national discussion on this issue, and to further the kind of collaboration between colleges and universities that will produce the best methodologies and materials for this effort. We see these descriptions as part of an important dialogue to sort out problems and victories.

BALL STATE UNIVERSITY
MUNCIE, INDIANA

This program at a mid-size public university offers writing courses from basic to advanced levels in any of three lab classrooms, equipped with Macintosh or Apple II computers or mainframe terminals. Each lab features different software, including MacWrite, Bank Street Writer, and a locally developed mainframe program, The Writer's Plan, that guides students through planning, drafting, and revising.

History of the Program

In recent years, Ball State University has made great progress in integrating computer technology into classroom instruction and faculty research. The Department of English joined the University effort in 1980, when it established its Computer Assisted Instruction Research (CAIR) Lab, which at first housed six Apple II+ computers and two terminals for our DEC 10 mainframe. The Department's Intensive English Institute under the direction of linguist Herbert F. W. Stahlke initially funded the CAIR lab to undertake research in CAI for non-native speakers of English. The lab quickly expanded to accommodate Linda Meeker's research in basic writing. Original equipment soon proved inadequate for researchers and, of course, for any significant number of students using computers for writing. The situation prompted Stahlke to form and direct a research team of six English Department faculty. The team obtained a Special Investment Research Grant from Digital Equipment Corporation, which equipped a new computer classroom (VAX Lab) by Fall 1984 with twenty-six VT241 terminals, each with DECTalk, on a VAX cluster.

In the meantime, Ball State University received state legislative funding for a long-range computer competency plan to develop mainframe and microcomputer resources, and these resources enabled us to expand the CAIR lab to a full microcomputer classroom in the fall of 1985. Since then, English Department labs have been used extensively for writing instruction and research. In 1985 the University created a new interdisciplinary Learning Center, complete with two microcomputer labs. Under the direction of Barbara Weaver, the Learning Center provides additional word processing facilities for writing instruction, peer tutoring, and research.

Legislative funding for computer competency has continued to provide resources enabling expanded faculty and student use of computers. Computer competency (defined as the ability to use the computer to solve problems and conduct research in one's major discipline) is now a graduation requirement for all Ball State students. Each college and department functions under a computer competency plan that sets forth goals for faculty development and student competencies as well as for acquisition of hardware and software. The English Department's plan specifies that by the end of the academic year 1988-89, 80% of the English faculty will have learned to use mainframe and microcomputer applications for instruction and research, and each English major will know how to use the computer as an aid to writing, which we believe is the most important use of the computer as a tool in our discipline. In addition, the English Department recognizes a responsibility to introduce new matriculates to word processing through basic writing and freshman composition courses. Currently, 40% of the sections of basic writing and freshman composition courses include word processing as a regular class activity, and we are steadily increasing that number.

We have relied on a slowly expanding core of dedicated faculty to demonstrate by example, through in-service training workshops and through special programs, the considerable benefits of integrating computer technology into classroom instruction and faculty research. As faculty become familiar with our substantial collection of courseware for various applications, they develop a basis for informed choices about the potential roles for computers in their classrooms. Outside the classroom, we are involved in training both the English Department and Learning Center peer tutors in the use of computers as aids to composing, thus enabling this important cadre to better service students and faculty involved in computer-based writing instruction.

Ball State's Learning Center and English Department, the two campus units most responsible for implementing computer word processing into freshman writing courses, have jointly undertaken leadership of the University's participation in the National Project on Computers and College Writing.

Instructional Theories

Ball State's Freshman Writing Program, an integral and important component of the English Department, offers at present five courses in the University's general studies curriculum:

English 099:	Basic Writing	Required of some students
English 103:	Composition 1	Required of all students
English 104:	Composition 2	Required of all students
English 114:	Honors Comp.	Substitutes for English 104
English 105:	Composition 3	Elective

Virtually all faculty members--both junior and senior, with backgrounds of specialization in both composition and literature--teach freshman writing. We work continually as a department to construct a coherent and unified writing program although some faculty are strongly committed to teaching writing as process and others are equally committed to more traditional methods. To this end, the Writing Program requires uniformity in the amount of writing, the genres of written products, and the application of evaluation and grading standards in all freshman writing courses. At the same time, faculty have a great deal of latitude in methods they use to help students meet course objectives. Not surprisingly, those faculty who have led the way in integrating word processing into writing courses have been most drawn to contemporary rhetorical theories and most committed to teaching writing as process.

Writing classes are organized by rhetorical modes and methods of exposition presented in a sequence intended to help students develop first personal, and then more academic voices, styles, and rhetorical strategies. Because the Writing Program leadership emphasizes an approach that involves students in planning, arranging, drafting, revising and editing whole pieces of discourse, most faculty view the computer as a powerful aid to composing--not as a provider of drills or exercises. In computer classrooms, students learn to use the computer to facilitate invention, reorganization, and revision as well as to improve editing.

Although basic writing classes were the first to use computers in writing instruction at Ball State University, computer writing instruction is now available in all writing courses, from basic writing to graduate composition courses. Computer word processing instruction and practice are required in a departmental major course in writing about literature. Currently, about 2,000 students each year take writing classes involving computers.

A Typical Computer Writing Class

Computer writing classes typically spend one-third to one-half of their time each week in the computer writing lab. Class lab time for drafting, revising, and editing each paper is integral to computer writing instruction because the lab environment fosters spontaneous peer response and encourages instructors to intervene in students' writing processes more naturally and more frequently than is generally the case in the classroom. Instructors build on that spontaneous collaborative activity during classroom sessions to promote effective peer evaluation and to help students make the transition from writer-based to reader-based prose. We suspect that seeing their work on a computer screen objectifies the text for students; they seem more willing to ask for and accept criticism of a printed text (on screen or printout) than of a handwritten text. Ease of revision undoubtedly contributes to a willingness to revise.

In peer writing groups, students learn to respond as readers, not as editors, to the peers' texts, whether journal entries, short in-class writing, or essay drafts; group reports raise issues in specific texts or passages for class discussion. Group evaluations of texts are reserved for the late draft revisions and editing. Toward the end of the term, peer writing groups may be asked to select and defend texts that they would like to "publish" for the entire class. The writers, sometimes with collaboration from their groups, revise the texts a final time before printing and distributing them.

Hardware and Software

Ball State students are served by four computer labs belonging to or closely associated with the writing program. The English Department's CAIR lab, devoted to class instruction and independent use, offers twenty-three Apple IIe or Apple IIGS computers and four printers. Software includes *Bank Street Writer and Speller*, *WordStar*, *Print Shop*, and a variety of programs for self-instruction and practice including programs developed by graduate students and faculty, ESL programs, MECC writing programs, and HOMER. The English Department's VAX lab provides twenty-six VT241 terminals with DECTalk and three printers. The mainframe programs *The Writer's Plan* (developed by Ball State's Forrest Houlette), EDT, WPS+, EVE, and a variety of grammar and usage review programs are available in this lab.

In the Learning Center, students have access to thirty microcomputers (Macintosh, Macintosh Plus, and Apple IIGS). Each of two networks link a bank of Macintosh computers to a site server, an ImageWriter II printer and a LaserWriter. *Bank Street Writer and Speller*, *The Writer's Helper*, *The PROSE Tutor*, *MacWrite*, *Microsoft Word*, *AppleWorks*, *WordPerfect*, *MacDraw*, *PageMaker*, and *MacPaint*, and assorted miscellaneous programs are available in this lab. Most students choose Macintosh computers and *MacWrite* for their word processing needs.

A *Writer's Workbench* Lab, co-sponsored by the Department of English and Computer Competency, provides UNIX and AT&T computers with a network printer.

In addition to these labs, twelve microcomputer labs and one mainframe lab are available to students on campus. Hardware includes a complete range of Apple, MacIntosh, IBM, Zenith, and AT&T micros and DEC mainframe terminals, with all major word processing programs accompanying each microcomputer.

Importance of the Computer Writing Program

Ball State's computer writing program has evolved from the fortuitous conjunction of individual, departmental, university, and legislative goals. The steady increase in number of computer-literate English faculty who have enthusiastically integrated computers into their writing classrooms testifies to the positive effects of the departmental faculty development programs. Students who have been introduced to word processing in their classes have been enthusiastic about their new skill and knowledge. They have continued to use departmental and open labs for writing in subsequent courses.

As we have developed the computer/writing connection, faculty members have conducted small research projects to observe its effects on students and courses. We still know very little, however, about the specific effects of computer writing instruction on the writing itself, and look forward to seeing some of the findings of the National Project on Computers and College Writing. With the National Project, we believe teaching composition with the tools of technology comes of age.

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BELMONT COLLEGE
NASHVILLE, TENNESSEE

This program at a small private liberal arts college offers freshman composition and advanced rhetoric in a twelve station Apple II and Laser (Apple-compatible) lab. The program uses FrEdwriter for word processing and also incorporates writing exercises from the rhetoric text used by the writing program. The Holt Writing Tutor is available as a grammar tutorial and Sensible Speller is used as a spell checker.

How We Got Started

This computer-based writing program is designed for a small church-related college that currently does not have a significant budget for new computer equipment. This type of school is not often profiled in the literature I reviewed, although I synthesized much information from other programs, mainly public schools, large state schools, and small liberal arts schools with healthy grants. While all of this material was extremely helpful, and those people who publish in this area were generous with all their materials, I found no existing model to fit our school's profile.

A significant feature of this "program" was that it was not a "program" as such. The Literature and Language Department emphasizes its instructors' right to make decisions based on their own philosophy and practice and opposes the notion of an imposed writing curriculum. The Department recognizes the need for some consistency (usually in the form of grading criteria and word limits). Developing a program that was not a program required that I research student ability to use word processing, faculty attitudes toward the task, and teacher ability to teach writing with computer-assistance. I assessed these by teaching two computer-based writing units for two consecutive years in my Advanced Rhetoric classes, and through teaching a computer-intensive English 101 for two terms. Our school's dean made much of this work manageable through a course reduction and limited enrollment in the computer sections.

The first Advanced Rhetoric unit I taught allowed a preliminary investigation so that I would know what questions to ask before teaching a complete course. That course, likewise, gave me many more questions to answer before implementing a computer-assisted freshman course. The following information includes my pedagogical assumptions about word processing and writing, the strengths and weaknesses of the course, and a proposal for integrating word processing with writing in the current writing program.

The Classes Themselves: Learning from Experience

In the computer-intensive English 101-C (Fall 1987), I used the computer as a tool to teach the writing process. The class was designed to introduce students to word processing, but more importantly, it was designed to teach students how word processing can help with each step of the writing process: invention, drafting, revision, editing. I designed the course and assignments based on process theory, and allowed for a variety of computer options within the individual assignments.

I taught computer use as another strategy for improving writing as opposed to another way to type a final draft. Based on the assumption, endorsed by Bill Wresch, that computer orientation gives students a new tool to aid writing and is necessary, both on its own merits and because of its widespread use in the society*, I explored ways for the writing faculty to incorporate computer use effectively in the classroom while noting its potential and problems.

Mechanics: Number of Students and Kinds of Classes

The Department limited enrollment to twelve for the first two pilot courses of English 101-computer, but it anticipates increasing the number to the regular enrollment of twenty-two when the lab can be maintained more consistently and for longer time blocks.

I also teach a two-week unit emphasizing invention and introducing the word processor to fifteen to twenty upper-level students in a yearly Advanced Rhetoric course.

Course Content: Description of Class

As reflected in the syllabus and through the text selection, this course is process-oriented. I felt the best approach to my class was to keep it as consistent with the current 101 sections as possible because my objective was to generalize what I learned in one section to the Freshman Writing Program. Another factor in this decision was the small amount of funds available to purchase software and the limited time I had to make my own.

Essentially, several variables influence the ease with which word processing is used in a writing class, and a descriptive discussion of these variables, along with the class' ability to deal with them, contribute specifically to our department's attempts to integrate word processing into the writing program. The "discourse aims" indicate a progression of critical thinking that underscores our current writing program; I add it to show how the same aims for each section of English 101 would apply to our computer-oriented sections.

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* **Wresch, William.** *A Practical Guide to Computer Uses in English and the Language Arts Classroom*. Urbana, IL: NCTE, 1987.

Weeks 1-4

Instructional Aims

Introduce Word Processing
Stress Composing on the Computer
Stress Invention on and off the Computer
(Discourse Aim: expressive)

Strengths

Students could compose, revise, and edit one complete paper on the word processor with minimal in-class instruction by Week 4. However, I did not require each step to be turned in by this time because students were still struggling with their writing skills and I didn't want to place any other obstacle in their way.

Weaknesses

The biggest problem in the first part of the course was the double-bind created from teaching both writing and word processing at the same time. This problem is often sighted as significant in research at several institutions*.

Students had trouble scheduling their time to correspond with the lab's schedule.

Students who couldn't type were at a disadvantage in class. Students with access to other systems at home didn't want to learn another system for class.

Weeks 5-10

Instructional Aims

Stress Revising Drafts with Word Processor
Introduce Peer Review with Word Processor
(Discourse Aim: analytical)

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* Bridwell, Lillian and Donald Ross. "Integrating Computers into a Writing Curriculum; or Buying, Begging, and Building." *The Computer in Composition Instruction*. Ed. William Wresch. Urbana, IL: NCTE, 1984.

Strengths

Students revised beginning drafts much more readily and were therefore willing to work longer out of class to make a better product.

Students were more successful in the peer review process.

Weaknesses

Students often lost focus. In moving to analytical writing, students were unable to use a word processor very successfully because of the increased time involved in analyzing appropriately.

Students often submitted handwritten final drafts because they could not schedule enough time in the lab to make necessary final revisions.

Students with sporadic attendance dropped, partially because they felt hopelessly behind their classmates in several skills this class demanded (including word processing).

Weeks 11-15

Instructional Aims

Stress Revising and Editing
Stress Research Writing
(Discourse Aim: persuasive and analytical)

Strengths

The class did not go to the lab for Weeks 9-13. However, most students continued to use their own word processor (when available) outside of the lab; these students could remember the basics of the process and easily return to word-processing projects when assigned to do so. Of course, another weakness occurred. Those students without access to word processors in other places tended to have more trouble returning to it.

Students (and teacher) experienced what I term a "triple bond" in learning research techniques, writing strategies, and word processing skills.

In my effort to keep my course as consistent as possible with the other Freshman English sections, I also used the departmental grading standards for final themes, but for computer work, I gave credit for completing certain tasks on the computer. Students did not receive credit if they did not complete the assigned task.

Mechanics: Hardware and Software

The Humanities Lab that our program uses is devoted to Apple computers and is equipped with twelve Apple II series computers and four printers. Students used *AppleWriter* for the first term and *FrEdwriter* for the second. We changed word processors primarily so that students could afford to buy *FrEdwriter*, public domain software, for home use. Students also have access to *The Holt Writing Tutor* for drill and practice activity, although I never recommend it for classroom activity and seldom do so for outside activity because it is strictly drill and practice.

Responses to a Computer-Assisted Writing Program: Faculty and Students

Faculty

Because I am the only one to teach computer-assisted courses to date, I cannot report faculty attitudes towards teaching these courses other than my own very enthusiastic one. However, for the success of this program, I felt faculty attitudes towards the prospect of teaching them must be considered. I specifically wanted to know how much support the writing faculty was willing to offer, so I developed and distributed a survey of those attitudes that included interest, reservations and goals.

I found that most of the faculty were interested in computer instruction in the writing program; they agreed that word processing was a necessary and useful skill for writing students. However, most did not want to teach it and those who did have an interest in teaching felt some sort of additional compensation was necessary. I include some of the specific responses of the faculty because they are probably similar to those found in other faculties.

Reservations: Most responses to this question concerned the time pressures involved in learning new skills and learning to teach with new methods. Other responses indicated concern over lab space, time and personnel. One person felt that the money dedicated to this effort might contribute to a decrease in money allotted to library books.

Goals: Most respondents expressed personal goals of learning the word processing program themselves. Others wanted a well-trained staff for the technical aspects of word processing. Some felt the highest goal was for students to do one paper completely with a word processor, ignoring the interactive abilities of the computer.

Students

Student response has been overwhelmingly positive. In response to a blind survey of attitudes about how the word processor helped their writing, students responded in the following ways:

- "[The word processor] cuts down on the time for editing and rewriting."
- " I have not written a paper since [taking this course]."
- "[The word processor] helped me get my ideas down faster than writing by hand."
- "[The word processor] helped me get my thoughts out quicker."
- "[The word processor helped] in revision."
- "[My writing] improved greatly. I would much rather use the word processor. They should be mandatory for all English classes."
- "Correcting errors on the computer is much easier than on typewriters."

Only two students (out of twenty-four) felt the word processor had harmed their writing in any way with both reporting problems with the mechanics of word processing (formatting the page properly) as displacing time otherwise spent on improving their writing. These are valid criticisms and should be considered in any program.

One interesting yet unsuspected factor in the student response to the first course was prior knowledge of the course as computer-oriented. Seven students knew the course was computer-oriented and five did not--they were placed in at registration as the other sections closed. Two students from this latter group dropped; one was a part-time student with low writing skills and the other lacked sufficient motivation to attend class regularly. Computer use affected both of these students' decision to drop, but given their background and performance, neither would have been highly successful in a traditional introductory composition course.

Prior knowledge of the course as computer-oriented did not indicate any clear difference in performance, even though it suggested something about student motivation.

Future Plans

A General Proposal: As this program description has indicated, our computer-assisted emphasis is slowly evolving. Faculty response and current budget demands show that we may have trouble making drastic changes in our writing program; however, I feel strongly that computer-based programs are necessary and cannot continue with only a nominal effort. To offer computer-assisted courses without the proper material or personnel could damage student ability to learn future computer skills as well as adversely affect their writing skills, yet we can finds ways of slowly building a sound program.

To help ensure the success of our program in light of current budget and faculty demands, the next phase of our program allows for individual differences among teachers and maintains consistency through a process approach and texts that the other English 101 sections employ.

Short-Term Plan

All students should be required to use the lab (by requiring certain drafts or part of their drafts printed), and all students could use interactive software while securing help in word processing from the monitors. Immediate needs would include developing the hardware, software, and staff of the computer lab.

Long-Term Plan

Teaching strategies for incorporating computer use into the classroom would depend on teacher preference. Materials would be made available for the faculty to use as necessary but teachers would have the freedom of combining methods outlined in the computer manual and creating their own methods according to their needs. Some instructors might conduct two or three lab sessions for one project (as I did in Advanced Rhetoric), while others might use the lab only at the beginning of a term. Still others might prefer more intensive use as in the English 101-computer classes. Obviously, careful scheduling would be necessary. Currently, faculty diversity in teaching style, as long as certain criteria are met, underscores our writing program; this practice would continue with the integration of computer use.

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BENNETT COLLEGE
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In this small private predominantly black women's college, all freshman students, whether in the basic skills or the regular college composition course, write their essays on the computer. One class session a week takes place in the computer lab, where the instructor works with students individually and peers support each other's efforts. Students work on IBM PC's using EasyWriter or WordPerfect. Because of an interest in fostering students' research skills and integrating research into writing, this college is presently pursuing this addition of telecommunication equipment to the computer lab.

History of the Program

Bennett College, located in Greensboro, North Carolina, has an enrollment of around 600 students and is one of only two predominantly black women's colleges in the United States. In 1975 the College initiated a computer-assisted-instruction (CAI) program in English, mathematics, and reading as part of the general education program. This component utilized terminals linked to a mainframe computer center. The English program consisted entirely of drill and practice in grammar.

By the early 1980's the faculty had come to the conclusion that very little of what students learned in the CAI lab was carried over into their own writing. On the other hand, faculty had seen the receptivity of students to computer instruction and wished for a more effective way to use this tool. Research led them to the computer-assisted-composition movement, then in its infancy. After a number of site visits, in the summer of 1983 the chairperson of the of the Communications Department, which consists of English Speech, French, and Spanish, submitted a Title III grant proposal for funds to equip an IBM laboratory for computer composition as well as to purchase equipment to be used in speech, language and literature classes. This laboratory, named the Audio-Lingual Laboratory, was funded in October of 1983 and went into operation in the spring of 1984 as an integral part of the Communication Department with a director who reported directly to the chairperson of that department.

Our only major problem was space in which to situate the laboratory, and this was solved without much difficulty though it was necessary to place the facility in a building remote from departmental faculty's offices. Almost without exception, faculty and students gave enthusiastic support to the laboratory from the beginning. An occasional student tries to use her inability to type as an excuse to avoid work, but we simply tell her to get on with it as best she can and by the second class period we hear no more objections.

More important problems have arisen out of the success of the laboratory: other areas of the College are now requesting more and more computer time. There is an increasing conflict between the desire of the Department to be cooperative and the absolute need of the Department to ensure that writing students have as much access to the computers as is necessary.

Writing as Process

Our general approach to writing is process-oriented. We try to get our students to see that planning is necessary, that false starts are not uncommon, and that multiple revisions are a must. We encourage them to get their thoughts to order first, then to express them effectively, and only then to turn their attention to surface errors. The computer has made this a much easier task because it removes most of the pain from revision, and we have noted that students who form a habit of revising on the computer often retain the habit of revision even when they write off the computer.

This process is especially suited to our students, many of whom have had little experience at expressing themselves in writing. We, therefore, strive in the Basic Skills class to accustom students to this mode of expression by requiring them to do frequent paragraph-length assignments in which they are encouraged to communicate some aspect of their own experience. We require a minimum length (six sentences), which students often find difficult to meet at the beginning of the semester. However, as students become more comfortable with the computer, these pieces become much more developed, often running a page or more. In order to encourage experimentation and relieve students of the sense that we expect more of them than they can deliver, we grade none of this work initially. Instead students submit this writing for comment, and each student revises as frequently as she wishes before choosing her three best pieces to be graded at the end of the semester. The semester culminates in the production of a five-paragraph essay, designed to prepare students for the expository writing course. Students are encouraged, but not required, to take one of their earlier short pieces and develop it for this assignment.

In Communication Skills 102 (Expository Writing), students write six five-paragraph essays, progressing from writing related to personal experience to writing requiring more objectivity. This is intended to prepare them for work in Communication Skills 103, where they write analytical papers based on their study of literature, and Communication Skills 104: Research Writing. In Communication Skills 102, assignments are structured to require at least two revisions of each essay, with an opportunity to make revisions after evaluation by one or more peers and a final opportunity to revise work after the instructor has made a written evaluation of it (but not corrected it).

We have chosen to focus on the five-paragraph essay and on traditional rhetorical strategies because of the expressed need of our students, at this stage in their development, for some pattern to guide them. However, students who are able to write effectively without this support are encouraged to do so.

Course Enrollment and Structure

As noted above, only students in C.S. 101: Basic Skills and C.S. 102: Expository Writing are required to write all compositions on the computer. Since about two-thirds of our incoming freshmen take C.S. 101, during the fall semester we usually have six or seven sections of 101 with eighteen to twenty students per section and three or four sections of C.S. 102: Expository Writing, with twenty to twenty-five in a section. In the spring we usually need only two sections of 101, one for second semester entrants and one for students repeating the course, and six sections of 102.

Each section of 101 and 102 meets three times a week, twice in the classroom and once in the laboratory. Initially, because we began with only ten computers, we had to schedule overflow labs, supervised by the lab director. This was a satisfactory arrangement because the lab director had a Ph.D in English and extensive experience in the teaching of writing, which enabled her to function as a classroom teacher in assisting students individually or in groups with their *writing* problems, and enough experience with computers to equip her to instruct faculty and students in the use of the word processing program and to handle minor computer problems. Indeed, she had been chosen for the position because we wished the computer lab to double as a complete writing lab, which any student on campus could visit for assistance with a writing problem, whatever tool she used.

However, we soon lost our initial director to another institution; and we were unable to find anyone with the same qualifications. Therefore, we hired a new director with computer expertise only. At that point, it became a major goal of the faculty to increase equipment in the computer lab to accommodate entire sections so that all students could work with the supervision of a writing instructor. We were able to reach this goal with the assistance of Title III funds.

Students now use the lab time to work on writing assignments with individualized assistance from the instructor. Students are also free to consult peers. In C.S. 102 classes about two-thirds of the classroom meetings are scheduled around peer-group work with emphasis on developing editing and proofreading skills*.

The faculty is also taking advantage of having an entire class in the lab to try some new teaching techniques during the lab period, including collaborative writing and peer group editing on the computer. In 1987-88 we were awarded a Title III grant to investigate networking our computers so that an instructor may monitor student writing as it occurs and interact with the student in the writing process through online real-time conferences. We have since been awarded a United Negro College Fund/Exxon grant of $25,000 to begin the networking process and we anticipate further funding from Title III.

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* See Virginia A. Tucker, "Changing Student Attitudes Toward Writing Using a Combination of Computer-Assisted Composition and Peer-Grouped Evaluation." *The Computer Assisted Composition Journal*, Summer 1986.

We plan to use the ENFI process developed at Gallaudet, using CompuTeach software with an IBM Token Ring network. This system will allow the instructor to look over the student's shoulder as she writes and intervene with suggestions designed to enhance higher-level writing skills, e.g. logic, concreteness, development of ideas, ordering of ideas, etc. as well as to address lower-level skills, e.g. grammar and punctuation. It will also lend itself to group instruction of various kinds, and we hope that the student's awareness of another reader will develop her sense of audience.

We also wish to move toward a new emphasis on the development of research skills and writing based on research, areas in which our students are generally weak. The addition of telecommunications equipment to the lab would make it possible fo the college to gain access to external data banks; and students in research writing classes would be charged a lab fee to cover the cost of a specified amount of connect time. In addition, we would purchase some computerized bibliographies such as the MLA online bibliography. We are also looking toward a remote tie-in with our campus library, when computerization takes place there. This would make it possible for the instructor to demonstrate computer research techniques in the laboratory to the class as a whole.

In the meantime we encourage our students in C.S. 103 and 104 to continue using the lab for their writing assignments and try to make sure that ample free time is available for them and for any student who wishes to use the computer for a writing assignment in any class.

Each semester we also schedule a one-hour course, called Writing Lab Only, in which interested students are exposed to a variety of word processing programs and to graphics software. Any student of the College may take this course, which is taught by the lab director.

Hardware and Software

At its inception in 1984 the Audio-Lingual Laboratory had ten IBM personal computers with dual drives and 64k of memory, later upgraded to 256k, and ten IBM Graphics printers, the faculty having decided earlier that they did not want to waste lab time because of shortage of printers. In succeeding years seven more IBM Personal System Computers, seven IBM Proprinter I printers, eight IBM Personal System/2 computers and eight IBM Proprinters II printers were added for a total of twenty-five IBM computers and printers by the fall of 1987. In addition, a Xerox machine was purchased in 1987 to make multiple copies of a student's work to use in class without so much wear and tear on the printers. All of this equipment was funded by Title III.

Further, Sloan Foundation funds provided five color monitors, one Epsom color printer and five "mice" for use with software made available for art classes.

We initially selected *EasyWriter* as our word-processing software because of its simplicity. However, we began using *WordPerfect* with some students in the spring of 1988. *WordStar* and *PC Write* are also available to faculty who wish to use them.

We have evaluated such invention programs as *HBJ Writer* and Wresh's *Writer's Helper* and have purchased the latter for use with individual students as an instructor may wish. However, we feel that these programs have limited use because the questions they ask tend to force students into inappropriate and sometimes wildly hilarious directions to the amusement of our faculty but the dismay of our students.

We also have available an authoring program, grade book programs, grammar programs, GRE sample tests, *PFS: File* and *Record* and *MacPaint*; but these, with the exception of the GRE materials, are used only by individual faculty members.

What the Students and Faculty Say

Student are asked to complete a questionnaire evaluating the usefulness of the lab as an adjunct to classes. Almost without exception students have positive feelings though, not surprisingly, the level of excitement students feel has decreased as more and more students arrive who have already had exposure to the computer. An interesting finding is that large numbers of students say that they can *see* errors better on the computer. We had expected them to say they could *correct* them more easily, but surprisingly few mention this fact, perhaps because it is so obvious. We have speculated that a certain amount of distancing is taking place, that is, the computer may make it more possible for the student to look at her own writing as though she were looking at someone else's writing and, thus, see it more objectively.

The most noticeable effect, however, has been in the increased length of student work. Some evaluators have found this a mixed blessing, but our faculty feels that the increase in length is generally related to better development and enhanced concreteness, for instance an increase in the use of example. This may be because we stress these virtues in our classes and in our written evaluations of student work.

Paradoxically the computer has made the faculty's job both easier and more difficult. On the one hand, all agree it is a joy to read a legible piece of work and that the time expended reading a single paper has markedly decreased. Better development also makes the papers more interesting to read. On the other hand, multiple revisions mean more papers to read, though this is somewhat alleviated by the use of peer readers at some stage of each paper.

Recently we did a survey of course grades in C.S. 101 and 102 for the past seven years to see if there had been a noticeable improvement since the computer writing component was added. We had anticipated an improvement because subjectively we felt that the writing of our students had improved markedly during the period. To our surprise we found that no such improvement was indicated by course grades. After considerable discussion, we came to the conclusion that while student writing had probably improved during the period our expectations had also increased and that, therefore, our grading standards had been raised. Many faculty remarked that when a student has multiple chances for revision and revision has been made so relatively painless, she should be able to produce a near-perfect paper. Therefore, faculty members described themselves as much more intolerant of surface errors, attributing them more to lack of effort than heretofore. They also noted that they expected much more in the way of development since empty paragraphs are targeted by the instructor early in the writing process. A student who fails to revise such paragraphs to make her paper more interesting is looking at a maximum grade of C, assuming her paper lacks surface errors.

Impact of Computers on the Bennett College Writing Program

We believe that the major impact has been on our basic writers, about three-fourths of our entering freshmen. On the most basic level, the computer has overcome the problem of poor orthography identified by Mina Shaughnessy in *Errors and Expectations*. It is a pleasure to see the pride these students take in exhibiting an attractive piece of work unmarred by poor penmanship, erasures, corrections, etc. Many students even ask that their papers not be folded in half because they don't want them spoiled.

On another level, the process approach to writing, which is greatly facilitated by the use of the computer because of the ease of correction and interpolation, has overcome a great deal of writing phobia. Once the student grasps that writing is done in stages, that it can be corrected, expanded, polished until it is a felicitous statement and that she will be commended for multiple revisions, not ridiculed, many dams are broken; and students with varied and interesting experiences become free to communicate them to others. In this way, a great deal of real writing talent is often uncovered in a so-called basic writing class. The storytellers emerge. Many students begin to become as fluent in the written word as they already are in speech.

Thus the computer has helped break the chains which encumber and disempower so many of our students. Since the only way to learn to write *is* to write, any method which removes unnecessary constraints from the process and encourages practice is a major breakthrough.

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BLUE MOUNTAIN COMMUNITY COLLEGE
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The Blue Mountain Community College CAC program is a virtual zero-budget program using existing hardware and software. The result is a non-hardware, non-software specific writing lab structure which can be tailored to any hardware and software configuration. Classes are taught in the computer lab with data files in place of most lectures. The students begin the class when they have assembled, usually prior to the arrival of the instructor, and discussions are one-to-one or small groups. Resembling controlled chaos, the lab is a hub of interaction.

Design and Purpose

The Language Arts Department of Blue Mountain Community College (BMCC) began offering computer assisted composition (CAC) in the belief that computerized instruction in writing would not only lead to a change in writing skills but would also lead to a change in the way students perceive writing: a cognitive change.

From Inception to Implementation

Blue Mountain Community College is on the quarter system. The BMCC-CAC program began with a Fall 1986 freshman composition course (WR121) with a student population of twelve students (maximum per class enrollment is sixteen based on the number of terminals in the lab). While pre-enrollment screening is minimal, enrollment is limited to students with typing/keyboard experience.

The following quarter (winter) both a freshman composition course (WR121) and a second quarter freshman composition course (WR122) were offered, again with about the same population. Students entering WR122 were not limited to those who took WR121-CAC. As a result, WR-122-CAC acquired some new students and lost some continuing students who wanted to return to the more traditional composition course or who had a conflict in scheduling.

During the spring quarter, WR122-CAC was again offered for students wishing to continue with the WR121-WR122 series of composition courses. While student populations tend to remain constant, the spring quarter has the greatest attrition level: students in the spring quarter have usually been through the lengthy composition series (Basic Composition WR115, WR121-CAC, and WR122-CAC) and lose some of their energy.

During the first year, students spent five hours per week in the computer lab under the direct supervision of a language arts instructor plus additional open-lab hours on their own. They prepared all of their compositions on Apple IIe computers, following rhetorical models and using *AppleWorks* and *SpellWorks* software. Students engaged in simultaneous composing procedures on the computers rather than just typing prewritten documents: they prewrote all work in the lab using brainstorming, free association and blind writing; wrote rough drafts, proofread and edited, using peer/instructor collaboration as well as spell-check software; and continued a series of rewrites. Through stages of ongoing interaction, the compositions were polished until each student was satisfied with (1) the document, and/or (2) the grade for each assignment, or (3) until the student was "sick and tired of rewriting" a particular assignment. The student could, of course, branch off to another aspect of the subject, change subjects, or lay the piece aside for a period of time to allow distancing while working on another assignment. Revisions were limited only by students. They could persist as long as they wished.

Problems and Changes

While the five hour per week composition class allowed the students more in-class writing practice, it created scheduling problems as it conflicted with other general education core classes which met two or three hours per week at the same time. Furthermore, it did not match in hours the other composition courses, which met three hours per week. As a result, the CAC courses were rescheduled to three hours per week, meeting Monday, Wednesday and Friday.

Rescheduling the CAC class from five hours per week to three hours involved both benefits and sacrifices. The five hour CAC course had been offered only at 9:00 a.m. Monday through Friday to avoid conflict with other computer lab demands. Benefits of rescheduling included resolution of class scheduling conflicts both for the computer lab and for other core curriculum course offerings, and access to prime hours of the day. While the students had no difficulty in making up the lost hours of computer use, the most noteworthy loss was in reduction of student/instructor interaction to three hours per week.

Results of CAC

The first and most notable change in student writing was an increase in the quantity of pages produced. While this in itself is not an improvement in writing quality, it indicates a change in interest and willingness to write. Since all of us believe that we can best teach writing by getting students to write, CAC breaks through the first barrier to effective writing: the feeling that one has nothing to say. Students willingly fill the screen with rows of words, phrases, sentences and paragraphs, knowing that they can eliminate useless material without having to recopy usable material. They play with words and ideas.

The second change is a qualitative change in student writing: "Papers come in beautifully formatted...they are easier to read...new versions are stapled to the old so that the instructor can flip back and forth...."* The result is a paper that has been revised at both the surface and the deeper levels.

The third change is the students' willingness to confront the corrections suggested by all three audiences: the peer group, the instructor, and the computer itself in the form of spell-check software. Students enter into discussions about their writing, consult with peers, try organizational and thematic variations using cut-and-paste, delete superfluous material and admit that rewrites are not as painful as they had been before CAC.

This admission results in a fourth change: attitudes about writing shift from tales of horror to experiments in "what if." Writing becomes a collaborative effort with four audiences: (1) the computer serves as the immediate audience, (2) peers form the extended audience, (3) the instructor acts as critical collaborator and arbitrator for debates, and (4) the author becomes a part of the audience by becoming slightly more objective, although admittedly this is the most difficult change to take place in the writing process.

The first and fourth audiences mark a significant change in the writing process, a change that can be attributed directly to CAC. Rewrites no longer entail the lengthy process of recopying the document. Furthermore, revisions in writing are treated as a fact of life and not an assault on the ego of the author. The computer, for instance, is infinitely patient and without emotion or malice. When it points out a misspelling, it is in no way assaulting the sensitivity of the author. The author will accept this criticism (especially when the first word cited as unrecognizable is the author's name). And exchange, therefore, takes place between the author and the computer. Furthermore, while the author may lose patience with tracking down a repeated misspelling or other error, the computer never throws a tantrum or loses the least bit of patience.

Throughout this composing process, writing becomes a shared activity. The cognitive actions of the writer must be adjusted to respond to both the writing process and the interaction process as they occur simultaneously. As Levin found, writing on the computer is not the solitary activity that writing with a pencil and paper is. Writing at the computer is collaborative and "more public."** Unlike the typewriter, the computer can interact with the writer.

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* Sadler, Lynn Veach. "The Computers-and-Effective-Writing Movement: Computer Assisted Instruction." *ADE Bulletin*, Fall 1987: 28-33.

** Levin, J., M. Borvta and M. Vasconcellos. "Microcomputer-based Environments for Writing: A Writer's Assistant." *Classroom Computers and Cognitive Science*. New York Academy Press: New York, 1983.

CAC as a Writing Workshop

Recognizing that few truly heuristic software packages are available today, and with an Apple IIe computer lab and *AppleWorks* integrated software already in place at the College, the English Department implemented a writing program that would allow students to begin writing by the second class meeting and transfer their skills across the curriculum to other disciplines including computer science (integrated software applications), social sciences, nursing, history, music, etc.

While text analysis programs such as *Writer's Workbench* and *HBJ Writer* are available and rising in popularity, BMCC chose not to use these computer-as-critic packages. These writing tools may have their place in various types of written communication such as technical writing; however, they do not necessarily teach good writing skills but have a tendency to create software-dependent writers. The Language Arts Department of BMCC sees its role in CAC as producing writers who are neither software nor hardware dependent.

Students and CAC

Left to themselves, most students would probably ignore or misuse most computer revision aids. "All writers, but especially students, need guidance from human readers, most likely a teacher who understands the writing process and the computer's place in text preparation"*. Computers cannot process language as the human brain does. Computers must rely on patterns formulated into categories. We must then ask ourselves, do we want all our students to write only in predetermined patterns?

We at BMCC offer effective, innovative instruction in the rhetorical modes without the flashy text-analysis software being touted today. Our students learn to write by writing daily, by revising a draft while it is in the early stages of development, by using the computer as both a tool and an audience, and by using both right-brain and left-brain capacities in the composition process.

With the possible exception of three lectures delivered during each quarter, the remainder of the class time is devoted almost exclusively to writing lab. Material that may normally be delivered in lecture format is instead prepared in a data file and file copied to student disks. Students can recall such material as needed. Discussions take place in peer groups and the instructor floats from group to group or student to student as the need arises.

When a lecture format is utilized, data files of lecture outlines are file copied to student disks, and the students have the outline on their screens during the lecture. They can then take notes right to the outline, cut and paste their lecture notes, and print a hardcopy of the lecture outline with integrated notes when the lecture is completed. The result is that students interact with the lecture outline by way of the computer.

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* Kiefer, Kathleen E. "Revising on a Word Processor: What's Happened, What's Ahead." *ADE Bulletin*. Fall 1987: 24-26.

Hardware

The CAC course utilizes the existing computer lab: Sixteen Apple IIe student terminals and four Imagewriter printers (four terminals per printer), plus one instructor Apple IIe with Imagewriter printer and overhead projection capabilities.

Software

The BMCC-CAC program is non-hardware/ software specific. The program is not dependent upon any format or parameters. Because the English Department had a zero budget for CAC but the Computer Science/Math Department already had an Apple IIe lab and *AppleWorks* software in place and available, the CAC program chose to share site licensed software and the lab. One additional advantage was quickly realized: students taking other courses utilizing *AppleWorks* could prepare their word-processing documents in CAC and tailor them to meet other course needs, hence instant across-the-curriculum coursework.

As an additional software tool, *SpellWorks* was chosen because it proofreads a document but does not suggest corrections nor assist in making them. The students remain responsible for structure and mechanics including dictionary searches. The computer does not become a crutch for mechanics: students are more likely to remember or correct a spelling deficiency when they are forced to interact with the word rather than to select it from a prepared list of alternative word choices.

Program Effectiveness

The majority of students selecting CAC have been students who have more writing skills weaknesses than students who have enrolled in the traditional composition courses. These are students who see the computer as a means of lessening the pain of composition and their fear of writing. Because of these less-than-friendly attitudes about writing, these students are more willing to try a new program. The result has been a more dramatic improvement in writing skills, one that brings them up to a competitive level with already proficient writing students. In other words, weaker students very often catch up with their peers through CAC. Students who enter CAC already proficient writers transfer their skills to their course work but make greater gains than they would in the traditional course.

Another benefit has been in increased faculty curiosity and interest in CAC leading to greater emphasis in across-the-curriculum development. Not only has the English faculty become much more computer-literate, but faculty in other disciplines are demanding the quality of work from all of their students that they see being generated by students concurrently enrolled in CAC. In many cases CAC students are gaining an edge in other disciplines because professors can devote more attention to document content and organization and less to mechanics.

Writing will always be a painstaking process requiring discipline and commitment. The computer provides impetus toward a new commitment and a different kind of discipline: playing with words.

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BOWLING GREEN STATE UNIVERSITY
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This program at a state-supported university offers developmental and regular freshman writing courses, as well as occasional graduate-level ESL composition courses, in a twenty-eight station, AppleTalk-networked Macintosh laboratory. The program uses MacWrite for word processing, Acta for prewriting and Hypercard for research and data-base applications.

An Overview

Bowling Green State University (BGSU) is a state-assisted institution serving more than 17,000 students, including 15,000 undergraduates. General Studies Writing (GSW), our freshman writing program, oversees a curriculum involving more than 8,000 student enrollments per academic year and twelve-week summer session. Within the last decade, the General Studies curriculum at BGSU has evolved into a comprehensive, coherent, well-structured, writing environment that lends itself well to research into the composing process and composition pedagogy--especially in view of its carefully planned placement and proficiency exam exit system.

Because the Department of English offers an M.A. and Ph.D. specialization in rhetoric and composition, there also is an unusual consensus among faculty and the University administration that composition is a foundational subject area and a curriculum that deserves particular attention and focus campus-wide. Consequently, the institution as a whole and the Department of English in particular have built an attractive array of resources to support continuing research in composition theory and pedagogy. These resources include a growing library of volumes and periodicals in composition and rhetorical theory, our Institutional Studies Center and Statistical Consulting Center, which assist faculty and graduate students in designing, executing, and interpreting the results of research projects, and our newly opened Macintosh Computer Lab that augments our freshmen writing program.

The English Department has always been involved in self-scrutiny and research projects that improved its undergraduate teaching core. As recently as 1982-85, the Department received an NEH grant to revise the English undergraduate major, specifically integrating the teaching of literature with the composing process: writing as a mode of learning. The GSW program itself participates in the Early English Composition Assessment Program (EECAP) that annually administers and evaluates writing placement exams for high school juniors in Northwest Ohio and provides a database of information about the literacy levels among the secondary students seeking admission to BGSU. It is this commitment of the University at large, the College of Arts and Sciences, and the Department of English to excellence in the teaching of writing that has made possible the environment that supports our emerging computer-assisted writing curriculum.

The General Studies Writing Curriculum

The GSW program, informed by contemporary research in composition, rhetoric, linguistics, and learning theory, promotes the goal of assisting students in gaining reasonable proficiency in expository writing--the genre of writing most likely to be required of its students during their college and professional careers. To accomplish this purpose, the GSW program has designed and instituted:

- An English placement test, a holistically-evaluated timed essay, which seeks to place students in the composition course which most suits their needs as developing writers.

- Three expository writing courses:

  1. English 110--Developmental Writing: designed especially for students who need intensive instruction and practice with the writing process. In the course students are introduced to a variety of prewriting/invention techniques, drafting strategies, and revision and editing methods as they write and revise fully six full-length essays. These students typically need more attention to grammatical and mechanical problems.

  2. English 111--Introductory Writing: designed especially for those students who need further instruction in the writing process, especially writing to specific audiences with a variety of purposes, organizing and developing ideas, and achieving coherence within and beyond paragraphs. These students typically need less attention to grammatical and mechanical problems.

  3. English 112--Varieties of Writing: designed especially for students who have a basic control of the writing process who may now move on to instruction in genres of writing tasks they will be expected to complete in other courses. The emphasis in this course is particularly upon critical thinking and analytical skills that must be demonstrated in synthesis, summary and research writing.

- A uniform set of evaluation criteria ("Rubric") which can be used for diagnostic, instructional, and evaluative purposes. The Rubric is an evaluation instrument consisting of six basic categories or points of view from which to evaluate writing: audience, organization/theme structure, development, sentence structure, word choice, and grammar- usage/mechanics. The Rubric is designed to encourage a holistic or general reaction to a text and then the enumeration of specific strengths and weaknesses.

- A proficiency exit examination which serves to certify that students have reached the appropriate level of competence required to exit the course they are taking. The exam system has several components, including an official grievance procedure, established eligibility requirements to take the exam, a carefully designed exam--a timed essay holistically graded by multiple readers--an exam situation, and an instructor appeal system based on a portfolio of a student's work throughout the term.

- An S/No record grading system for English 110 and 111 and an A/B/C/No record grading system for English 112 which allows us to require, without affecting their transcripts or GPA's, that students re-enroll in a particular course if they have not achieved the appropriate level of proficiency.

- A comprehensive in-service program which stresses teacher training and supervision in an attempt to provide all students with quality instruction. At the beginning of each semester in-service meetings are conducted to remind returning instructors of the goals of the GSW program. All new graduate instructors are required to enroll in English 591--Composition Instructor's Workshop--in which students meet each week to discuss such topics as the components of the composing process, the relationship of grammar to the process, remediation in special reading and writing programs, and the more practical issues of daily planning, assignment-making, and evaluation of student prose.

Computer-Assisted Composition Instruction as BGSU

Our computer-assisted composition instructional program began as a pilot project in 1985, when four instructors, including project coordinator, Dr. Bruce L. Edwards, taught control and experimental sections of our English 111 writing course, using existing university lab facilities. Our case study of representative writers from that pilot project convinced us that computer-assisted writing pedagogy lowered writing apprehension in our freshman students, increased the syntactic maturity among those who saw the word processor as a significant revising tool, and encouraged natural peer involvement in the development of assigned writing tasks. The success of that preliminary project led to an equipment grant from the Ohio Board of Regents that has culminated in the Macintosh Lab described below. We are continuing to develop a broader-based integration of word processing and conventional rhetorical skills into our standard GSW curriculum.

Presently, fifteen sections of our English 111 course, Introductory Writing, are taught in our Macintosh Lab. The existing non-CAI syllabus for that course reflects the GSW commitment to teaching writing as a process of personal discovery and public presentation, and serves well as the basis for the word-processing version. Students meet their classes in the lab and various word processing skills are meshed with the composing skills established as paramount for the English 111 sequence.

In the first two weeks of the course, students participate in a tutorial that trains them in the use of the Macintosh and *MacWrite* software and they are asked to compose and print a hard-copy text in response to an assignment designed to lead them through various components of word processing: entering, inserting, deleting, cutting and pasting text. Students write approximately five full-length essays during a semester and are asked to produce all prewriting, drafts, and revisions with the word processor so that a history of each of their texts is preserved. Revising and editing are also taught, however, as working best as both hard-copy and online processes. As the semester proceeds, students are taught to use an outliner and spell-checker as adjuncts to prewriting and proofreading, respectively. During the semester, students participate in group editing sessions online, using the networking features available in the lab. From each workstation, a student can open a peer's document and make comments or changes in it. In summary, students are shown that, as writing is a recursive process that involves making various changes and adjustments according to purpose, audience and focus in a text's evolution, the word processor provides the writer with the optimal composing environment for making appropriate choices and changes with greater ease. Our plans are to expand the number of sections that can be accommodated in our lab and other University facilities as funding for more hardware and software becomes available.

Instructor Training and Classroom Assessment

All instructors who teach computer sections of our GSW curriculum must complete a three-hour, semester-long in-service course, Computer-Assisted Composition Instruction, in which they learn basic computer skills, the use of word-processing and text-analysis software, and the pedagogical uses of the computers in the teaching of writing. In addition to the already extensive pre- and post-assessment instruments already in place in the GSW program, our assessment involves:

1. The use of extensive pre- and post-questionnaires to assess attitudinal changes toward the writing process and particular components within the writing process (prewriting, drafting, audience-awareness, revision, editing, the helpfulness of peer editing, online commenting, disk-submission of texts) and toward the idea of textuality itself (to what extent does writing and reading malleable text on a computer screen affect a writer's sense of commitment to ideas and format of a text?)

2. The application of a battery of textual analysis to determine to what degree word processing affects: the kind and number of changes a student makes in revision, an increase or decrease in certain kinds of sentence and word-level errors, and the changes in the length and variety of T-units in student prose from the beginning of the term to the end of the term.

3. Interviews with selected students to ascertain how writing with the word processor affects such factors as the time it takes to begin and complete a draft, how long it takes them to become comfortable with keyboarding and particular kinds of software, and the degree to which writing with a word processor becomes "natural" or "unnatural" to them.

Hardware and Software Facilities

Hardware: The English Department operates two computer labs. The General Studies Writing program administers a Macintosh Lab which houses a network of twenty-eight Macintosh Plus workstations and one Macintosh SE with a 20MB Hard Disk that functions as the network server, using *AppleShare*. Presently there are four Imagewriter II printers that function in the network. The General

Studies Writing program selected the Macintosh because of its ease of use and quick, general accessibility to students. The Department also administers a Technical Writing computer lab that contains seven IBM PC workstations, ten Apple IIe workstations, four Epson FX printers, a graphics plotter, and an Electrohome Projection System for the Apple IIe. The Department has access control of both labs and presently schedules writing classes in them during normal weekday class times and may schedule workshops and open lab times during evening hours.

Software: The Macintosh lab currently features three kinds of software available to each workstation: word processing (*Claris MacWrite*); prewriting (*Acta*, *HyperCard*), and proofreading/spell-checking (*SpellsWell*). Also available in the lab are multiple or single copies of page processing software (*Microsoft Word* 3.01, *Ready-Set-Go*); graphics software (*MacPaint*), database/spreadsheet software (*Microsoft Works*); and various public domain fonts and desk accessories that assist in the writing process. The Technical Writing lab features similar software for the IBM PC and Apple IIe, including the word processors *WordPerfect*, *WordStar*, and *AppleWriter*.

Program Effects and Importance of the Project

Our initial pilot study indicated that students took greater interest in their development as writers--were willing to take more responsibility for both the content and stylistic choices in their texts--when they worked with the microcomputer as a drafting/revising tool. Instructors as well found their enthusiasm for and innovation in composition pedagogy increase as they taught with computers. At the end of our first year in our own Macintosh Lab (1988), we have seen these impressions and hypotheses confirmed again, but wish to go beyond these outward signs of inward improvement and dedication to more verifiable, empirical means of testing.

The one telling effect of our computer-assisted instruction within the GSW program has been a campus-wide recognition of the importance of teaching writing in every subject area and within the conventions of specific disciplines. It has thus boosted our formerly unsuccessful attempts to establish a writing-across-the-curriculum orientation within our Arts and Sciences College and beyond. We fully expect the research begun within the freshman English sequence to eventually influence the whole campus: thus helping to restore linking diverse pedagogies not only technologically, but also humanistically, rhetorical arts to a place in the university curriculum lost in the post-Enlightenment preoccupation with the physical science. That linkage has, in fact, already begun in view of the fact that the GSW program's strongest supporters outside of the Department of English are now to be found in the Departments of Computer Science, Biology, Physics, and Chemistry.

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BROOME COMMUNITY COLLEGE
BINGHAMTON, NEW YORK

This approach at a medium-sized community college allows students in basic writing courses and in other courses employing writing, to use three labs, all equipped with IBM PC's. All labs have First Choice and Writing Assistant word processing programs, and several locally developed tutorial programs on sentence development to aid students who are not in writing courses. This unified approach is the result of the College's effort to encourage writing in all the curricula.

College's Background

Supervised by SUNY and sponsored by Broome County, Broome Community College serves the greater Binghamton area of 200,000 people, In 1987-88, the College enrolled 4,200 full-time equivalent students, about 50% of the area's high school graduates, in four divisions and forty-seven programs, ranging from Accounting and Dental Hygiene to Paralegal Assistant and Communications. All programs require students to take at least one composition course. The college has traditionally emphasized technology and is well-equipped with computers. Each division has at least one lab with ten or more personal computers (PC's) and/or main frame terminals available for student use outside of class.

English Department's Involvement with PC's

The English Department's involvement with PC's began through the support of the Writing Across the Curriculum Committee (W.A.C.C.) in 1984. Two English instructors, Richard Stoner and Antoinette Aleccia, who were also members of W.A.C.C., showed interest in learning about PC's for their own writing as well as for possible use in their developmental composition courses, and a W.A.C.C. member, the Chair of Computer Science, offered to train them in using the PC. In addition, the Dean of the Business Division offered use of his Division's hardware, and the Dean of Technology allowed the two English instructors to share an IBM grant that the Technology faculty had received for evaluation of various PC software. In the Fall of 1984, these two English instructors scheduled weekly classes of their developmental composition courses in the Computer Science's PC lab for writing workshops. The next year, the positive reactions from students and instructors to these writing workshops led the English Department to join the Business Division in obtaining a VEA grant to equip a PC lab for shared use. In 1986, the English Department was able to set up its own PC lab. Currently, most

English instructors are using the PC in some fashion with their students, whether in basic writing courses or with CAI tutorials.

More importantly for Broome, English instructors' interest in PC's for instruction was the catalyst to make more meaningful the concept of writing across the curriculum for the campus community. Heretofore, many departments, although very concerned about the quality of student writing, did not understand the complexity of writing as process. But these departments began to instruct English faculty in PC's, and this provided the avenue for communication. Thus, as Computer Science faculty taught English instructors how to use PC's, the English faculty made the Computer Science faculty aware of the importance of the editing process in writing, beyond turning on the spell checker to clean the document of errors. When the Business Division was interested in acquiring *Rightwriter*, a text analyzing program, to use with their students, they asked English faculty for their assessment of the program. These consultations created the opportunity for English faculty to explain the differing philosophies governing grammars. In addition, Engineering Science instructors asking English colleagues about the value of *Narcissus*, a program that organizes ideas for writing outlines, led to a discussion of rhetorical forms--classification, description, etc.--which instructors needed to know in order to program Narcissus for student use. These examples illustrate how the PC has opened up a line of communication between the English Department and other College faculty concerning the larger purposes of writing.

Sharing of software among departments is another method for bringing somewhat disparate departments together over writing matters. In the fall of 1988, most English teachers using PC's in their writing courses will have their students purchase *PFS: First Choice*, which the Computer Science Department and Business Division are also requiring of their students. At the price of an average text, this software package contains a very powerful word processing program as well as spreadsheet and database programs that the students will use in several departments. Since Business and Computer Science faculty will teach students the mechanics of word processing in *First Choice*, they may also take the opportunity to do some instruction in writing. For example, Computer Science instructors, while teaching block moves and search and replace methods, may use exercises in revision and pronoun replacement developed by English teachers. Such cooperation should have the effect of making students realize that good writing is as important to their Computer Science or Business teacher as it is to their English instructor.

Response from students to writing on the PC's has been generally very positive. A recent English Department survey revealed that 24% of the students own PC's and over 70% have had experience with PC's in high school and/or in other courses at Broome. Consequently, they have little difficulty in using the PC's for writing. Those few who resist working with the PC or who find that learning its operation detracts from concentrating on writing are not forced to use it. During the lab hour, they can write at a desk provided in the computer lab. However, these students rarely number more than one per section. This student knowledge of the PC has greatly expedited training time in keyboarding and allowed for more concentration on writing concerns.

Faculty use of the PC has grown exponentially. In the English Department, the original two instructors who first incorporated PC's into their composition courses have been joined by virtually all the instructors of basic writing courses and a few others who teach advanced composition and literature courses. While those involved with basic writing courses have most readily adapted to using the PC's in their courses, most of the English faculty have supported student use of the PC for writing by encouraging use during open-lab times and/or by allowing for some class time for lab work. Several problems keep English faculty from using the PC's in more innovative ways. These include inadequate laboratory space, budget restrictions on hardware purchases, and the lack of simple writing programs that would make the College's mainframe more desirable to use.

Since the English Department's approach to teaching writing is generally one of process, with emphasis on development through listing, drafting and editing, the Department has quickly recognized the PC as an important tool in advancing this method. Faculty who use the PC have little compunction in assigning several revisions or asking for several versions of the student's writing since they know that the student can experiment with his/her editing easily.

The English Department has incorporated PC's most readily into two developmental freshman composition courses: one for students with skills significantly below college level; the other for students whose skills need only a little development and refinement. Each course obliges the student to attend four classes a week. The fourth hour, designed to be a writing workshop, allows the student to write in the PC lab. The standard composition courses meet three hours a week and generally do not schedule weekly PC lab time. A few instructors in these courses have arranged to have at least one class a month in the labs or have scheduled office hours in the lab periodically so that they can help students edit their writing on PC's.

New CAI programs in literary terms and in types of stages used in Western theatre will soon allow students in literature courses to use the PC's for other than composing. The Writing Center is also experimenting with programs to aid the learning impaired to master writing skills despite handicaps such as dyslexia.

This past year over two thousand students have worked in the English Department's PC lab. While the majority have used the lab as part of their course work in composition courses, a large number have used it to write papers for other courses and have used the lab's CAI software to aid them in reviewing writing skills. Many of these students have come to the lab because of suggestions made by their instructors in other departments. In addition, hundreds of students write daily in the various PC labs around the campus.

Routines in the PC Lab

Most composition courses incorporating PC's schedule one class hour a week in the computer lab for students to compose their assignments. During the hour, the instructor usually scans the monitors and goes to those students in need of assistance. Typically, students' compose in lab a first or reworked draft of a written piece that has been developed in outline form or in handwritten sketches before the lab hour. At the end of the session, students usually submit a hard copy of the assignments to the instructor for grading or review. One instructor allows students to write collaboratively as an outgrowth of group work in researching debate topics. How this works is four or five students develop a general outline of their group topic on one PC. Afterwards, each student saves this outline on his/her own disk. Based on this group outline, each student must then develop details, anecdotes, and research material for his/her own essay. The PC allows these students to share ideas efficiently and to give each other support in a concrete way during lab time; it also permits each student to develop an individualized paper.

Although English instructors have not yet developed extensive writing software, they have developed some useful basic material to use on the computer. Some have used the word processor to write exercises that students copy onto their disks to work on. In addition, two English teachers have created CAI programs in Pascal and Pilot that review sentence structure and aid in organizing ideas into the five-paragraph format. These instructors assign students to use particular programs during class time. Since each of these programs can provide printouts of exercises and quizzes, the printouts can be used as tests.

By the end of Broome's fifteen-week semester, students in composition courses using the PC's average about thirteen scheduled class hours on the machines. Students spend most of this time on editing drafts of paragraphs and essays with the instructor's help. Students also spend many more hours in open labs around the College working on writing.

The English Department's PC lab now has both *Writing Assistant* and *PFS: First Choice* available for student use. In addition, it has several CAI programs on sentence problems such as run-ons and active-passive voice confusion, and on organization techniques. These programs have proven quite popular, and other departments have considered ordering copies for their labs.

The English Department's lab consists of eighteen IBM PC's with four printers networked to the machines. The machines, however, are not networked to share software. The department also owns a large screen monitor that could be connected to a PC. An English instructor can use the Computer Science Department's "Autohome," a projection device which attaches to the PC.

Evaluation of Program

The English Department has carefully monitored the effect of the PC on student writing to justify future hardware purchasing decisions. During the past three years, instructors, using PC's in composition courses, have distributed an English Department questionnaire to students, asking them to evaluate their writing experience. In the Fall 1987 questionnaire, over 80% of students said working on the computer helped them to improve their writing. Students were perceptive in acknowledging that the chief value of the PC was in its editing facility that allows the writer to save several versions of the writing for comparison. More interestingly, the PC has made writing for students an orderly process of sketching, drafting, and reworking. For some, the machine has anchored the writing process to a place where they can work productively, namely the PC laboratory. Here students can settle down to the task of writing and editing in a quiet environment.

In addition, in 1986, the College funded four English faculty to study more closely the effect of the PC on the improvement of student writing in basic writing courses. These instructors concluded that students using the PC's generally wrote better than their peers in the control groups by the end of the semester because they spent significantly more time on editing and re-drafting. The statistics from the study show that 11% of students in control groups wrote more than three drafts of papers while 31% of students using PC's edited three or more drafts. These observations, gathered from three years of data from the student questionnaires and the College's 1986 study, match the observations of others across the country. Like Carolyn Kirkpatrick, at York College, CUNY, we think that "With advice and feedback on successive drafts, drafts that the word processor makes possible for the first time in a basic writing course, our students have proved to be able to revise and develop their content--sometimes very impressively."* The Department now is considering reorganizing all of its composition courses to have four contact hours per week. This schedule would enable all students to have supervised writing time on the PC's.

In sum, the English Department's involvement with the PC has changed perceptions of writing among and within departments and has enabled decisions affecting writing and computer use to be made more cooperatively. Campus-wide, faculty have come to realize the advantage of having students write with the PC and have, at the same time, become more aware of the English Department's view of the writing process. College administration has recognized the English Department's growing role in computers at our institution and for the first time in the College's history has appointed an English instructor to the College's Computer Committee, which oversees hardware and software purchases and policy. Moreover, college-wide curriculum changes beginning in 1989 will require each department to include writing-emphasis courses as part of its program. This change should make the PC even more important to faculty as well as to students who can use the machine to review basic writing skills and editing techniques. The PC has become for Broome a valuable tool in implementing critical goals in writing across the curriculum.

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* Kirkpatrick, Carolyn, "Implementing Computer-Mediated Writing: Some Early Lessons," *Machine-Mediated Learning*, V.2 n. 1 & 2, 35-45, 1987, p.39.

UNIVERSITY OF CALIFORNIA
SANTA BARBARA, CALIFORNIA

The Program in Composition at U.C.S.B. offers a year-long freshman composition sequence along with a variety of advanced courses in nonfictional prose. Composition Program courses comprise the greatest single usage of the University's Microcomputer Lab, one of the largest such facilities in the country, with separate laboratories housing networked computers (Macintosh II, Mac SE, Mac Plus, IBM PC, IBM PC/AT) and providing a wide range of software, including word processors, spell- and style-checkers, graphics utilities, page layout programs, business programs, programming languages, and database managers. Composition faculty are pursuing research in computer-aided writing curriculum and are designing coursework including text-analysis software, manuals and command sheets, online desk accessories that provide assistance in grammar and usage, and interactive Hypercard stacks and authoring programs that assist instructors in developing computer-aided writing tasks.

Overview: UCSB, the Writing Program, and the MCL

UCSB is one of the most computer-rich universities in the country, and the Writing Program of the Department of English accounts for much of the computer usage on this campus. Word processing instruction has been integrated into English courses at all levels, including interdisciplinary writing courses, technical writing courses, and advanced composition courses, but it is used most extensively in the freshman composition sequence. The UCSB Microcomputer Laboratory (MCL) is one of the largest facilities of its kind in the United States, from the perspective of its hardware and software inventories, the diversity of its curriculum offerings and programs, the scope of its software inventories, the diversity of its curriculum offerings and programs, and the scope of its usage by students. Of this usage, 40% (or about 130,000 machine hours) is from students in the Writing Program.

Each academic quarter the MCL delivers instructional computing to over 4,000 students, meeting more than 70% of the undergraduate computing demand. During 1986-87, over 60% of Writing Program faculty utilized the MCL in some way, accounting for 67,507 hours of Microcomputer Lab time. This year writing instruction will account for nearly 90,000 hours of MCL time, including freshman composition courses, English 42 and 106, and courses in the Program of Intensive English and the Interdisciplinary Writing Program. The Writing Program is the largest single user of the Lab and writing instructors continue to add computer components to their classes.

The MCL was established in 1979 with extramural funding largely from the National Science Foundation, the Fund for the Improvement of Post Secondary Education and the California Post Secondary Education Commission. Over the years the lab has increased its staffing, core budget, and machine complement considerably, making it a substantial organized center on the UCSB campus. Presently, the Lab facility consists of six separate laboratories, each equipped with master lecture stations, overhead monitors (four each), public address capability, hard disks or hard disk servers, local-area networks, and a wide selection of commercial software. The specific hardware complement in the six labs is:

- Apple IIe/+ facility: sixty-four machines with Corvus Omninet LAN, numerous dotmatrix printers;
- Macintosh-A Laboratory: thirty-nine Macintosh SE/Hard Drive machines, AppleTalk LAN, LaserWriter Plus printer;
- Macintosh-B laboratory: twenty-five Macintosh Plus machines, AppleTalk LAN, Sun Talk File Server and Sunol Hard Disk drives;
- IBM PC laboratory: thirty-seven 640K PC's each configured with 20 MB hard disks, Hercules graphics cards and tape backup capability;
- IBM PC/AT facility: twenty-seven PC/AT's each with both MS-DOS and Xenix operating systems, expanded memory, 80 MB hard disk storage, the IBM LAN, networked printers.

The sixth facility, the new Open Access Lab, contains fifty-four microcomputers, mostly Macintoshes, some IBM PC's with two LaserWriter Plus printers and a large complement of software. While the first five labs are available primarily for enrolled students in college classes, the Open Access facility--as the name implies--offers free access to all members of the university community.

The software inventory at the MCL is also extensive. It includes many word-processors, spell- and style-checkers, graphics utilities, page layout programs, business programs, programming languages, database managers, and more. A needed corollary of this is training. As part of the Open Access facility, the MCL consultants conduct seminars for interested students who need assistance with, or desire more in-depth knowledge of a particular system or software package. Additionally, there is a consultant in the instructional labs at all times in order to provide users with answers to questions as they arise. Consequently, it is not difficult for students to gain access to computing, or to understand the particulars of hardware and software operation.

As the above configurations suggest, the MCL is an ideal location for computer-curriculum development and implementation, and the Writing Program has been most active in the development of the laboratories from the beginning. In 1980 the Program of Intensive English (PIE--a sub-department of the Writing Program, serving economically disadvantaged and minority students) began to conduct classes in, and to develop materials for the first-generation MCL, which consisted of twenty Apple II+ and IIe machines. PIE began involving other faculty members from the broader Writing Program, and soon a core group of writing faculty developed. As is often the case, new technology spread by the example of a few key individuals, and microcomputer usage expanded rapidly throughout the Writing Program. From the early *AppleWriter* on the Apple II to *Microsoft Word* on the new Macintosh SE, the writing programs have exposed students to virtually every important text processing program and microcomputer available.

Additional Computing Resources for Writing Instruction

In addition to the MCL, there are a number of other resources available on the UCSB campus through the Computer Center, PIE, the Writing Program, residence halls, and off-campus businesses.

- The Writing Program has set up its own computer room with two Macintosh computers, two IBM PC's an Apple IIe, five dot-matrix printers and one letter-quality daisywheel printer. Software currently available in the Department's computer lab includes *Microsoft Word*, *MacWrite*, *AppleWriter IIe*, *MacDraw*, *ReadySetGo*, and *MacSpell Right*. Expansion boards recently purchased for the PC's increased their memory from 256K to 640K.

- Building on the increasing use of the MCL by writing instructors, the Program of Intensive English was recently granted a Macintosh SE for its fourteen faculty members, who are already using the machine for student conference and tutorial sessions, for development of instructional materials, for the electronic computing and recording of students' grades, and for record-keeping.

- The South Coast Writing Project, a branch of the National Writing Project, has become involved in the use of microcomputers in the elementary and secondary schools in this area through the efforts of Dr. Stephen Marcus, Assistant Director, who has also written extensively on computer-aided instruction at the university level.

- The UNIX operating system on the campus mainframe computer is available as a resource for word processing free of charge to any student who wishes to use it.

- Santa Barbara is the corporate office of Kinko's academic courseware exchange, which gives students and faculty easy access to a major source of academic courseware. In addition, Kinko's provides ready access to students and faculty seeking to laser-print documents when the MCL is full.

- Francisco Torres, an off-campus dormitory, has opened a computer room for its residents.

- The Tutorial Center, which serves students in the Program of Intensive English, has been granted a MacPlus for students using its facility. The Program of Intensive English trains Center tutors and brings them into composition classes taught in the MCL, where tutors assist students in a writing workshop environment. Tutors are able to schedule appointments with these same students, and to continue working with them on the Center's on-site Macintosh.

- Faculty involved in producing *The Writer's Bloc*, a publication produced yearly by the Writing Program to showcase excellent student writing, are using computers in the layout and design of the publication.
- Writing faculty have developed award-winning desktop publishing classes for disadvantaged minority and ESL students, in conjunction with local high schools and the local Private Industry Council.
- Students are bringing their own computers to the University in increasing numbers. Faculty estimate that 20-30% of the students in writing courses at UCSB have their own computers or have access to a computer.

Pedagogy: Using Computers to Teach Writing

There is a wide diversity in the methodology of instructors using computers to aid the teaching of writing at UCSB; this diversity reflects the variety of teaching philosophies of the instructors in the Writing Program. Some instructors merely suggest that their students use computers, while others teach, conduct writing workshops and even hold individual student conferences and office hours in the lab. Most instructors using the MCL require that papers be written on the computer and require computer-generated rewrites for most or all papers. Some instructors use sequenced prewriting exercises for use on the microcomputer, while others use techniques such as invisible writing, freewriting, clustering, listing, outlining and peer editing. Several in-lab writing workshops stress visual communication as well as verbal, and technical writing courses additionally focus on such formatting considerations as the use of white space, bullets, fonts, columns, graphics, and charts. Yet, despite this variety of approaches and methodologies, the goal for all of us who use computers as an integral part of our teaching is to work the computer--traditionally seen in the humanities as a cold, dehumanizing contrivance which distances teacher from student--into a student-centered approach to teaching composition.

The general, though not absolute, consensus among those using computers for composition instruction is that having students work on the machines, if only as word processors, facilitates their acquisition of writing and thinking skills. We have found that students working on word processors revise and edit their work more quickly than those working on typewriters, are more interested in making word-, sentence- and paragraph-level changes and are more willing to restructure their papers where needed. We have also become convinced that working on word processors makes students more conscious of and more confident in the writing process. Some argue that the early success to which CAI's advocates have laid claim may depend on the attractiveness of new technology rather than on the indisputable superiority of computer-based materials. But even if the advocates' claims fall short, many advantages--not the least of which is the word processor itself--will probably survive the infidelity of fashion.

Faculty involved in computer-aided instruction have developed software and course materials to facilitate students' acquisition of the reading, thinking and writing skills necessary for their success at the University. Some of these include:

- A desk accessory called *Extra Help!* along with a supporting program called *HelpFileMaker*. These make it easy for an instructor to provide on-line help, advice and assignment notices to all students in a class. The information can be presented in a structured format, with an index of help topics. It works much the same as the online *Help* manual in *Microsoft Word* and other Microsoft products; however, *Extra Help*! is more general, works with any program, and allows the instructor to create custom help files. It can be used in conjunction with any word processor.

- *GASP* (Guided Authoring, Self-Paced tutorial system, developed by Mark Ferrer), an authoring program created to enable teachers to produce their own computer-based reading, thinking, prewriting and revising materials. The system allows the instructor to program lessons for home and in-class use and to create a sequence of activities requiring careful writing, reading and/or analysis without overwhelming students with the complexity of the material or assignment. *GASP* currently runs on IBM PC's with 256K of internal memory and dual disk drives and on the Apple IIe with CP/M Z80 card. There are plans to produce a version for the Macintosh as well.

- A desk accessory called *TextCount*, developed by Dr. Muriel Zimmerman, which provides text analysis statistics for any text file--word count, average sentence length, grade level, and others. It can be used in conjunction with any word processor capable of saving a document as a pure text file.

- *TechWrite*, a desk accessory, also created at the request of Dr. Zimmerman, which has some formatting capabilities and extensive text analysis features.

- A book, *The New Writer*, by Joan Mitchell and published by Microsoft Press. The publication shows students how to use the computer as a wholly new tool to improve their writing at every stage of the process, from prewriting and planning, to writing the rough draft, to critiquing and revising. Readers are introduced to electronic writing tools such as idea processors, outliners, spell- and style-checkers and style sheets. The final chapters discuss formatting for final publication or distribution.

- Special files of composition and grammar exercises on disk, for use by students in writing workshops in the MCL.

- User's manuals and command sheets for word processing and desktop publishing programs commonly used in the MCL and in the Writing Program computer lab, including *MacWrite*, *Microsoft Word*, *MacPaint* and *PageMaker* for the Macintosh, *WordPerfect* and *Microsoft Word* for the IBM PC, *AppleWriter*, and *AppleWorks* for the Apple IIe.

- A slide show, *The Marvelous Writing Machine*, designed by Joan Mitchell, to allay computer anxiety and to give an overview of computers and the ways in which they can improve one's writing.

Evaluating the Effects of Computer Usage on Writing and Instruction

The Writing Program has not undertaken a formal and systematic study of the effectiveness of CAI or word processor use on the improvement of writing skills. Such a study would be of considerable instructional and research interest to us. This, among other reasons, has prompted our interest in participating in the CUNY project. We have, however, assessed faculty and student opinion every quarter, and both groups agree that the word processor is indispensable for writers.

Each quarter over 95% of the students who are using computers to write and revise their papers for composition courses report on surveys that they have been aided by the computer in developing their writing and rewriting skills. The same 95% say they will continue to use computers for writing in the future and will not return to the typewriter.

We have also assessed the effectiveness of word processing as a writing tool by judging student performance. We examine and judge the quality of student work written with and without the aid of computers, we look at courses set up to teach writing into which word processing and CAI are integrated, and we study the effects of peer editing using files on screen. Our conclusion--that the word processor has had considerable success in helping students with prewriting, drafting and revising--is based on qualitative assessment, as we have not yet found a satisfactory or extensive quantitative measure of writing which conforms to our sense of the process. Common sense and experience as yet prove more informative and reliable than quantified measures. As programs and experience become more sophisticated we will be better able to assess the effectiveness of these programs, and, as an outcome of that assessment, we will develop and refine our use of the computer in the teaching of writing, thinking and reading.

Program Leadership in Computer Writing

The Committee on Computers in the Writing Curriculum (CCWC) developed as a response to a need for long-range planning to integrate computers into the writing curriculum. The general purpose and activities of the CCWC are to:

- Conduct workshops--both through the Writing Program and the Office of Instructional Development--to advance computer skills of Writing Program faculty;
- Assist faculty in developing computer-based instructional materials;
- Keep abreast of the latest research on computers and composition;
- Deliver talks on issues related to computer-aided instruction at professional conferences;
- Form liaisons with other academic units that use computers or support instructional computer use;

- Recommend policies for allocating computer time in the MCL and process requests for computer use;
- Purchase, maintain and upgrade computer equipment and software in the Writing Program's computer room;
- Produce a newsletter, *The Desktop*, designed to inform Writing Program faculty about current developments in computers in writing, both on campus and nationwide;
- Set up and maintain a library of written materials on computers and writing;
- Meet with visitors from local high schools and other colleges to help them set up personal computer labs in their schools.

The CCWC has met approximately once a month since its inception, and with the support and encouragement of the Writing Program's administration, has made substantial progress towards implementing its goals. The foresight and willingness of administration and staff to experiment has resulted in excellent computer facilities and activities that are models for other academic departments on campus, and for other campuses nationwide.

Michael Petracca
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The Committee on Computers in
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COLORADO STATE UNIVERSITY
FORT COLLINS, COLORADO

The primary purpose of the Computer-Assisted Writing Center at Colorado State University is to provide a computer-based writing environment for students in freshman English courses. More than 2,000 students in freshman writing courses and approximately 200 students in advanced courses use the lab, which contains two AT&T 3B2 computers and fifty work stations. The lab is staffed by a faculty director (with one course release time), a graduate assistant, and fourteen undergraduate English majors. Students in Basic Writing sections attend the lab as a group; other students sign up for lab time independently. Software includes WordPerfect, Writer's Workbench, electronic mail, and locally developed exercise templates.

Background

In the few years since computers have been tapped as teaching tools, Colorado State University has established itself as a national leader in computer-assisted composition instruction. One of the first departments to invest in computers for writers, Colorado State University's English Department has also been--from the outset--committed to integrating computers into the composition curriculum. Beginning in 1981 with a small lab devoted to the *Writer's Workbench* style-analysis program, the English Department has expanded its lab into a comprehensive computer-writing center serving more than 5,000 students annually. From their initial use of style analysis programs to their current use of prewriting programs, electronic mail, and word processing, CSU faculty have complemented successful classroom practice with innovative uses of the computer.

The Computer-Assisted Composition Center (with 5,000 terminal hours available each week) accommodates both entire classes and individual students: some classes attend the lab in a group with their instructors; other students attend the lab individually, signing up in advance for computer time. Students begin by learning a word processing program through a tutorial called *Learn*, an online introduction to the commands they will need to use the computers for their writing. In addition to word processing, students and teachers can select from a range of computer aids for writing, including prewriting programs, revision activities, a sentence combining program, the *Writers Workbench* style-analysis programs, grammar review exercises, electronic mail, and several additional word processing and formatting programs. English majors work as lab monitors, helping students with the computer programs. Writing tutors are on duty at selected hours to help students with writing problems.

The lab is staffed by a faculty director and English Department graduate assistant, fourteen undergraduate English majors who work as lab monitors, two writing tutors, and two computer science graduate research assistants. Students use the lab for all their classroom-related writing--for composition courses and others across the curriculum.

Key Ingredients of Successful Programs

In *Computers in English and Language Arts: The Challenge of Teacher Education** We summarize some components of thirteen successful computer-writing projects from across the country: (1) they all emphasize composition theory, not computer applications; (2) they consider word processing rather than fancy software to be the central computer program; (3) their faculty have initiated the projects, which also have administrative and technical support; and (4) they all include ongoing teacher training programs.**

Our program at Colorado State University is similar to many of these "model" programs. In the next section, we describe our approach to implementing computers into the composition curriculum.

The Computers and Composition Program at CSU

Simply providing word processing is not our goal. Rather, CSU aims to integrate word processing into the writing process by providing prewriting and revision aids, as well as other computer-based tutorial support for writers. Our commitment to careful integration of computers into the composition sequence guides our research and teaching.

Basic Writing: Students in Composition Fundamentals have a regular "lab" hour in the Center in addition to their two classroom contact hours. Computer activities are integrated into a standard syllabus used by all instructors. Because instructors or tutors are often present while students are writing or revising at the computer terminals, students can ask for writing help when they need it--when their writing problems occur--not days later. When students are prewriting, someone is available to help them brainstorm and develop ideas. Often, instructors check to be certain that students do not begin drafting too early. As students are drafting, instructors frequently help student writers develop or clarify ideas. While students revise their writing, instructors help them focus their attention on meaningful changes rather than on cosmetic ones. Occasionally, teachers suggest that students trade seats and comment on one another's writing directly on the computer monitor. Or, teachers may ask students to "mail" their files to others (using the computer's mail program), so students can offer revision suggestions to one another as a homework assignment. Finally, when students use the basic writing version of *Writer's Workbench* to assist them in editing their papers, instructors can provide immediate help and guidance.

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* (NCTE, 1989), Cynthia Selfe, Dawn Rodrigues, and William Oates, eds.

** (These projects are described in detail in part one of *Empowering English Teachers: Computer Training In English and Language Arts*, Selfe, Rodrigues, and Oates, NCTE, in press.)

Freshman Composition: Students in Freshman Composition sections attend the lab independently, signing up for time slots in one-hour intervals or walking in as time permits.

The availability of word processing and computer programs to all students affects regular classroom pedagogy in a variety of ways: almost all teachers require extra revising because they know that their students need not retype papers to change them; most teachers require that students run the Collegiate Edition of *Writer's Workbench* on their drafts; some teachers develop classroom exercises and activities related to the *Writer's Workbench* output; other teachers create specialized computer activities for their students to complete during their independent lab time; and still other teachers require students to "mail" their completed writing to them so that they can comment before the next class (using capital letters to highlight teacher comments).

Advanced Composition: The English Department offers four different advanced composition courses: Intermediate Writing for the Social Sciences; Intermediate Writing for the Arts and Humanities; Intermediate Writing for the Sciences, and Advanced Composition. Students in these classes use specially designed prewriting programs and exercises that have been tailored to the requirements of their different discourse communities. Because many professors use a portfolio system for grading purposes, students in these courses tap the powers of the word processor as they rework their papers to improve them. Teachers have found that electronic mail works especially well in advanced composition sections: students with similar academic interests can be grouped to do collaborative writing, to respond to one another's papers online, and to continue classroom discussions by sending messages to their writing group or to the entire class.

English as a Second Language: Students in selected English as a Second Language classes meet in the computer lab with their instructors. These students are closely supervised during their computer-writing sessions by instructors specially trained in ESL pedagogy. Students use yet another customized version of the *Writer's Workbench*, a version that provides help with the kinds of diction, sentence structure, and grammar problems common to non-native speakers.

Faculty Involvement

Our program involves most English Department faculty in some way. Our composition faculty are involved in research and scholarship in computers and composition: designing and testing new software, editing journals devoted to computers and composition, and writing texts on computers and composition. Several faculty members teach graduate courses in composition theory and practice, interweaving computer applications into the courses. And all faculty in the Department teach composition and thus are involved in a department-wide commitment to integrating computers and composition.

Moreover, the continued support of our administration--our department head, our dean, and our provost--provides adequate funding for the program. As a result, we have been able to revise our program (which was originally limited to implementation of the WWB). We have added supplemental software, prewriting and revising templates, and an electronic mail program. We plan to move to implementation of *WordPerfect* as we begin integrating our computer lab with a new computer classroom. In the last two years, we have been able to hire a new faculty director and two computer science graduate assistants, who have helped by writing utility programs as well as implementations of other ideas to move teaching from the traditional classroom into a computer environment.

Teacher Training

Until teachers understand composition theory and pedagogy, they cannot effectively integrate computers into their teaching. Thus we devote much attention to teacher training--preparing our regular faculty and our graduate teaching assistants to teach effectively with a variety of computer tools. We routinely offer workshops and seminars for regular faculty to apprise them of the most recent developments in our research and teaching. Our preparation of new graduate teaching assistants is even more thorough.

The composition training program at Colorado State is one of the most comprehensive in the country. Teachers learn composition theory and pedagogy as they are introduced to computer technology. For about ten days before the fall semester begins, and continuing throughout the year, graduate teaching assistants complete an intensive training program to prepare them for classroom and computer lab teaching.

During the pre-semester training session, prospective teachers practice writing the same kinds of assignments that their students will be writing. In the computer-lab component of their training, they are led through writing tasks so that they can later model writing for their students. During the regular semester training, teaching assistants enroll in a seminar on teaching strategies in which they continue to discuss computer applications to composition sequences. They also audit freshman composition classes taught by experienced teachers to see just how computers and writing blend in a real class. Finally, they attend bi-monthly professional development meetings to cover other specific issues related to teaching writing and to integrating writing instruction with computers.

Looking Back and Looking Ahead

With these essential ingredients in place, we have been able to develop our expertise in computers and writing to better serve the needs of teachers and student writers. We have been able to test various uses of computers in teaching writing--modified those that are effective, rejected those that are not, and begun developing new uses. In 1988-89 academic year we began work in a new computer classroom and here have adapted and devised new techniques for harnessing the computer as a writing tool. And we have continued testing to see how best to apply computers to composition instruction.

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COLUMBIA COLLEGE
CHICAGO ILLINOIS

The Computer Assisted Composition Program at Columbia College uses PFS: Write Professional, English Achievement and outlining software on IBM PC clones. The college is a small, private liberal arts college with a strong graphic and performing arts curriculum.

Columbia College of Chicago is an urban, commuter college located in downtown Chicago. The college is committed to an open admissions policy, and our students come from every socio-economic background imaginable. Our composition classes reflect this diversity. Most of our 5,000+ students are attracted to the school by our excellent visual and performing arts programs.

Columbia's computer-assisted composition (CAC) program is only three years old. Much of those three years has gone into course development, software selection and faculty training. It's safe to say, in our third year, we finally have a cohesive, tried-and-true course for our students. Through trial and error, numerous software mishaps and experimentation in the classroom, our faculty has discovered what works--and what doesn't--at our campus. Probably every institution has to go through a similar process when its first composition courses are first "plugged in" to micros.

We were feeling the presence of microcomputers on our campus and in our classrooms long before we ever developed a computer-assisted writing course. Increasing numbers of students handed in essays composed, at least in part, on the computer. Faculty members were buying personal computers. Academic computing, once a small department at the college, burgeoned with new courses and facilities. The majority of our students, when confronted with writing assignments on the job, were facing VDT screens, not typewriter carriages. We didn't ask ourselves *if* composition should be taught in a computer lab, but *when* and *how*.

In the fall semester of 1984 I began to canvass the universities and colleges in and around the Chicago area, looking for possible computer-assisted writing course which could serve as a model for our own program. Unfortunately, few if any true composition classes were being taught with the aid of computers. Nearly all schools had general computer labs open for student use; some had installed computers for drill and practice sessions, most often when linked to ESL tutorials. But none had what we were after. Some further investigation turned up programs at Colorado State and Michigan Tech, but these programs, although fine and laudable in their own right, were too expensive and geared toward a more technical and scientific-minded student body than we tended to attract at Columbia. It soon became apparent that we'd have to go our own way.

A three-year grant from the U.S. Government's Title III program enabled us to purchase equipment and software and to train faculty. We ran pilot courses, no more than three per semester, which were used to test software and to develop new approaches to traditional composition assignments.

We've answered a lot of our own questions in the last three years, both technical and pedagogical. Three areas, we've found, need careful attention in implementing computer-assisted composition. These are equipment choice, involvement and training, and methodology.

Equipment

Every institution is different, and choices for equipment should reflect that difference. For instance, Apple equipment did not seem to meet our needs at Columbia for one basic reason--not a single English Department member was familiar with the Apple product line. IBM PC compatibles were happily churning out pages in a number of faculty homes already, so by default, MS-DOS machines seemed the likely candidates. An IBM PC clone won hands down on price and performance, and software for these machines was abundant. Each of our DAT PC compatibles has 640k memory, two floppy drives, a high resolution monochrome monitor and standard parallel/serial interfaces.

High speed dot matrix printers, attached to switch boxes, provide hard copy. Again, price was a concern, and we've found that one printer for every three to four machines is more than adequate in even the heaviest print-out periods.

We were faced with a decision concerning computer software--buy a limited number of quality packages and distribute them on a check-out basis, or try to provide each student with his or her own set of software. The later is preferable, we found: software check-out is an obstacle to student use. If they own the software, students are inclined to use it more often, explore the features, and do more writing.

Which software to use was, and continues to be, a matter of debate here. A solid, full-featured word processor is a must. Unfortunately, many of these software packages cost hundreds of dollars. Our first line of defense was to write our own word processor. Borland International offers a Pascal programming language product called *Editor's Toolbox*, with which you can easily create your own word processing program. I put an editor together, called it *Freewriter*, and distributed the package to our students free of charge. Of course there were minor bugs in the program, but by and large it served our purposes in the early pilot classes and gave us classroom experience to evaluate which word processing features our students needed and used the most without committing to an enormous software purchase.

Recently, a number of software manufacturers have begun to provide site licensing agreements to colleges, lowering the price students must pay for their products. We've shifted to the *PFS: Write Professional* word processor for this reason, and we're happy with its bug-free status. Diagnostic grammar and punctuation software such as Educational Testing's *English Achievement* is used in the CAC courses for initial skills testing. The students approach the software as if it were a game--the object being to better their score on a range of grammar problems. The program prints results of students' sessions, and instructors can selectively assign handbook chapters on the basis of those scores, conduct class lectures accordingly or devise specific rewrite sessions with certain identified problem areas in mind. Why spend a session on comma splices when only two of twenty students need that help? In addition, the students are introduced to the handbook terms by using the program; sessions with the diagnostic software naturally lead to classroom discussion of style and syntax.

We believe there is a place for such drill and practice software if the software is used diagnostically, rather than rotely. Software like *English Achievement* provides the student with an idea of his or her strengths and weaknesses and provides a basis for discovery and discussion in the classroom. Spontaneously, students involved with *English Achievement* have grouped around particularly tough examples, attempting collectively to find the right answer. Other students keep running tallies of their scores, trying to best their previous sessions, competing individually or in teams.

On a limited basis, students also have access to *Diagrammatic Writing*, an outline and brainstorming program on loan from the authors of the software at Methodist College, North Carolina. *Diagnostic Writing* is useful for students with organization problems; menus and queries, dynamically determined by the student's choice of topic, prompt a student through a thorough outline of an essay, which is reviewed by the student and instructor. Students who fear the very first word or who have trouble keeping to the point or developing a thesis have found this approach can at least get them started and keep them on track.

Lab

Columbia has built a lab area exclusively for CAC class use. We believe this sole use is important for fostering a sense of community: when not in use for CAC classes, the lab is open for CAC students to use to proceed with their assignments. This arrangement allows students from many different sections to interact, sharing ideas or word-processing tips.

In addition to the CAC lab, the English Department's Writing Center has two personal computers available for word processing and diagnostic testing. The use of the Writing Center micros is not restricted to CAC students--any interested teacher, student or staff member may use the supervised facility. Student tutors play a key role in the computer component in the Writing Center, assisting fellow students with the software, explaining the diagnostic tests, and providing comment of essays.

Faculty/Training

All faculty involved in the CAC pilots and program have taught and continue to teach non-CAC courses. Three quarters of the CAC staff are permanent, full-time instructors in our department. All CAC instructors are chosen for their commitment to the overall composition program as well as for their computer skills. In fact, experience has shown that an interest in CAC possibilities can foster increased computer literacy in the faculty. Computer wizardry is not a prerequisite--enthusiasm for writing is.

Training sessions for the use of specific software and hardware are held on a regular basis. Informal discussion and collaboration on lab and classroom techniques continue throughout the semester. The greatest training hurdle for most faculty new to CAC courses is getting comfortable with a totally new environment for the teaching of writing. Once teachers realize they are not merely asking their students to do word processing, they begin to feel free introducing traditional as well as unique teaching methods into their course.

Methodology

As the CAC coordinator at Columbia, I've discovered one salient fact: micros do not dictate pedagogy, no more than a hammer decides what you're going to build. Early uses of personal computers in language arts emphasized drill and practice, and consequently, many composition teachers felt rote-instruction was the only job the computer could handle. Five or six years ago, hearing mostly about these drill programs, I hadn't given much thought to using computers in the classroom. I did give thought, however, to buying a micro for my own writing. I went from typewriter to keyboard myself and found my writing *process* profoundly changed. As Walter Ong notes in *Orality and Literacy*, with the use of the computer, writing is no longer bound by a strictly linear procedure. Quickly the computer's classroom use for composing not just for grammar drill became clear.

The backbone of our philosophy in Columbia's CAC courses is simply writing is a process. We heavily emphasize drafting and revision in all the classes. CAC works best, we believe, when the course relies mainly on brainstorming, revision and collaborative editing, and review.

Beyond this main emphasis, instructors are encouraged to experiment with techniques. We have found, for example, that collaborative drafting and editing is a natural on the computer. Video display terminals are very convenient for students and instructors to gather around for discussion. Case study groups benefit from the intimacy and legibility of text on a monitor. Instructors can pass out, on disk, common files which the entire class can discuss, revise and submit. Peer editing is immediate.

Software shouldn't be viewed as just an editor, electronic typewriter, or substitute teacher. Just as the *English Achievement* program can be used creatively, the word processor can be used for more than writing and editing essays. A number of short, easy exercises using the word processor can lead to new ways for the students to view their writing process. Here are a few we use:

- Group revision of a student essay, handed out on disk;
- Creating and keeping a file of topics, ideas or assignments on disk;
- Switch-disk editing, in which students switch terminals, adding comments as a visiting editor;

- Group essays, each member responsible for the content, style and final appearance of the collective work;

- Black out writing in which all the monitors are turned off for a period of time and students are encouraged to freewrite;

- Walk Around in which students are encouraged to get up an roam the lab, reading as many different essays as possible;

- Class journal in which if possible, a computer is left running for students to jot down ideas, thoughts, electronic graffiti, whatever.

Yes, many of the above exercises can and are used in non-CAC courses, but the immediacy, legibility and malleability of the texts in a CAC classroom provide many more opportunities for the instructor and the student to explore writing. That exploration can happen right now, not next class session when everyone has the text typed up or the instructor has made copies for the class to share. A student has a puzzling revision problem? Gather some people around the terminal or save the text on a few disks to be instantly reviewed by others in the room.

Above all, the *full* use of computers and software in a writing classroom makes the classroom a *writing room*, first and foremost a *writing community*, which traditionally set-up classrooms cannot accomplish as easily. Students are not exclusively isolated in their own private process of composing, but can look around them and see how writing is accomplished throughout the room, in a number of ways. Writing classrooms have the feel of a city desk at a newspaper: experience advisors and peers are there *during* the writing process, offering on-the-spot suggestions, encouragement and criticism.

Because of many of the methods cited above, instructors find CAC courses disorienting at first: CAC is not the composition class they are used to--the classroom seems, at times, in chaos. For most of us, it is a new kind of teaching. At this time we at Columbia College need to determine if the CAC classes are merely holding their own with their non-CAC counterparts or offering a significant alternative to the teaching of writing here at the college. Students invariably remark on semester-end student evaluations that writing on the computer is one of the high-points of the course. Student morale is certainly an important issue, but it remains to be seen whether students actually get more from a CAC course than they would from our regular composition classes.

In our initial pilot courses we administered the pre- and post-Writing Apprehension Tests to the CAC sections and to a control group of students in non-CAC composition courses, using similar syllabi. By year's end, the CAC classes expressed less fear in showing their work to others, finding ideas for topics or submitting their work for a grade. Pre- and post-essay assessments between the two groups were nearly identical. No standardized grammar tests were administered. We have, however, noted a higher-than-average length in essays submitted by CAC students versus their non-CAC counterparts. At best our preliminary studies are sketchy and inconclusive, something which will be remedied in the near future.

Any English department wishing to implement computer-assisted composition courses will ultimately have to go through a discovery period. Every school has unique characteristics which will play a part in determining everything from faculty training to the choice of software. Throwing a word processor at a composition syllabus will yield few results, I'm certain. As I mentioned above, we view the computer as a tool, and use it to build the kind of composition classes we feel best address the eclectic and individual needs of our institution. When computer-assisted composition is approached in this manner, it's no more extraordinary or foreign than a brilliant, new textbook or your most ingenious classroom assignments.

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DAKOTA STATE COLLEGE
MADISON, SOUTH DAKOTA

Students in basic writing, freshman composition, and other composition classes at this small state college use an IBM 4361 mainframe to write. Xedit and DisplayWrite 370 are used to create documents. Students use locally-developed software: Wackford (a grammar and style checker), Pipchin (a monitor of student progress), Guppy (which copies instructors' comments onto student papers), and other software named after incompetent bunglers from Dickens' novels. Wackford and StrongWriter (a grammar and style checker for MS-DOS microcomputers) can be modified to suit particular instructors.

The use of computers for writing at Dakota State College started in the fall of 1983. In the spring of 1983, I had been writing computer programs in the SNOBOL4 language for literary analysis. It occurred to me that some of the same algorithms and coding could be used for a program that would aid student writers. During the summer of 1983 I wrote a program in SNOBOL4 that would point out blunders in student writing and make suggestions for revision; I called the first versions of the program *Blimber* and *Feeder*; I combined them into a production program called *Wackford*. (I name my programs after characters from literature, usually bunglers from Dicken's novels; Blimber and Feeder are incompetent teachers in *Dombey and Son*; Wackford is an abominable schoolmaster in *Nickleby*.)

The one hundred or more students in the four sections of Freshman Composition that I taught during 1983-84 used *Wackford* to get commentary on their papers. The program ran on a time-sharing IBM 3031 AP mainframe computer that used a *Complete* editor and an early version of the MVS operating system. It was an awkward arrangement. The editor was, of course, a programming editor which was not well adapted to editing prose. In order to submit the paper for *Wackford's* comments, a stream of job control statements had to be written in very cryptic, symbolic language. The process was very slow; it took almost an hour to enter a short paper and receive comments. Most of my students viewed the whole process as a complex, obscure mystery; some of them complained bitterly. However, when I made *Wackford* available to all students at the College who had a mainframe ID, I soon noticed that students who were not in my classes, who, thus, were not compelled to use *Wackford*, were nevertheless using it; a few of them told me that the program was of great value to them.

It is worth emphasizing that computers were first used for college writing at Dakota State College because they offered a means of giving students comments on their papers before an instructor saw them. Computers were not first used because they allowed students to compose and edit more efficiently; on the contrary, composing on a terminal was then strongly discouraged (students were asked to write out their papers first, and use computer time only to enter them), and editing was difficult.

Later, when students started using friendlier hardware and software, we realized, of course, that much of the benefit of students using a computer to write was in the much more efficient ways they could compose and edit: this alone would be sufficient reason to teach writing on a computer. However, stupidly, it was not an advantage I foresaw.

In 1985, I wrote a much faster version of *Wackford*, which had more features and was much easier to use. Although I have continued to revise it, this is the version of *Wackford* that is currently used. It runs on an IBM mainframe under an interactive operating system. It is used by all instructors of basic composition and freshman composition, and it is available to all students in the College who have a mainframe ID.

Although instructors who use *Wackford* can determine the exact nature of the output of the version their students use, the program typically gives four kinds of messages. First, it counts the number of words and sentences, computes an average sentence length, and comments on the average. Second, it tells students to avoid certain words (such as "irregardless") and pairs of words (such as "has went"). Third, it tells students to consider the context of (1) words and expressions which are commonly confused (for example who-whom), (2) forms of "to be" if they are frequently used, (3) nouns ending in -tion that could be changed into active verbs, and (4) other words that should be used. Fourth, *Wackford* provides a spelling checker.

During the summer of 1986, a programmer and I created a cluster of programs to work with *Wackford*. *Pipchin* (named after a governess in Dickens' *Dombey and Son*) can keep track of each revision of students papers and will share them along with *Wackford's* comments in a file that the instructor can access. Using a program called *Guppy* (named after a copyist in Dickens' *Bleak House*) an instructor can make individual notes on students' papers and can append to their papers comments of several pages or more which are held for instructors on a disk which all instructors can use.

In the winter and spring of 1988, I created *StrongWriter* (named after Dr. Strong, an amiable schoolmaster in Dickens' *David Copperfield*); it is a rewritten and expanded version of *Wackford*, which runs on MS-DOS microcomputers.

Since 1983, when I started using *Wackford* with my students, there has been much discussion among members of the English faculty about the use of computers for writing.

In the first place we discussed the value and appropriateness of students using grammar and style checkers like *Wackford*. It was argued that current writing theory held that students should be concerned with fine points of grammar and usage only at the end of the writing process, not at the start of it. Since much of *Wackford's* output consists of comments on such fine points, it was argued that it should be used only near the end of the composition process, not at the start. Others pointed out that research showed that many students found it difficult to progress beyond unresolved questions of grammar and usage, and that therefore Wackford was properly used by students in the earliest stages of writing.

There was also concern that programs like *Wackford* sometimes bring out a teacher's worst instincts: they encourage professors to disallow their particular, trivial hobbyhorses, which other professors might ignore such as "alot" as one word). To this, it was replied that most writing teachers do circle certain words that they object to in formal writing. *Wackford* does the same thing, but does it with absolute consistency. Obviously, if a student is told that "irregardless" is objectionable in one place in one paper, it should always be so. A human instructor may overlook an "irregardless," and the student may suppose the word sometimes acceptable and sometimes not, thus experiencing confusion.

Most faculty thought there were three theoretical factors in favor of students using *Wackford*. First, any device, like *Wackford*, that turns students' attention back to their writing is no doubt good. Not only does the typical student return to the paper to correct "irregardless," but often the sentence and perhaps the paragraph in which it appears are rethought and rewritten.

Second, every writing teacher knows that many students consider their writing an extension of themselves, and they can feel crushed by criticism and a mass of red marks on their papers--especially from a teacher they like. Students' attitudes seems to be different with *Wackford*. Blunders that it points out are not taken as personal criticism. Students know the comments come from a simple machine that is programmed to search for specific things and, when found, print them. The program insists, "After all, what do I know? I am only a silly schoolmaster out of a Dickens' novel."

Third, teachers whose students use a program like *Wackford* spend less class time on grammar and more logic and rhetoric. In fact, the principle seems to be evolving that since computers can be very effective in pointing out mechanical writing blunders, that they should, of course, be used for that and valuable class time should never be used for such matters.

Many teachers believe that peer editing is an effective pedagogical technique in improving writing skills. The ability of students to send copies of their papers to other students using the MAIL or SENDFILE facility of a mainframe makes the mechanics of peer editing easy.

In addition, even most critical skeptics of writing on computers seem to agree that it is a very efficient means of composition and that editing on a computer is light-years ahead of doing it any other way. In order to achieve maximum efficiency, students must be taught to repeatedly practice the editing commands (such as MOVE, COPY, or DELETE) until they become second nature and can be used without disrupting the writer's train of thought. Thus the writer can change the text quickly to conform with sudden inspirations.

Dakota State College has approximately one thousand full-time students. Computers are used for composition, and *Wackford* is used for analysis by all students in ENGL 019 and ENGL 103. ENGL 019, Writing Development, is a basic writing course required for students who do not demonstrate the required entry level of competency in writing. It is taken by about sixty students each year. They use a special version of *Wackford* that helps them detect fundamental writing problems. About two hundred and fifty students take ENGL 103, Freshman Composition, each year. It is a standard first-year writing course stressing exposition and effective writing.

Although they might not be required to do so, students in other writing courses usually use computers, and sometimes use *Wackford*. A course in technical writing, ENGL 208, requires that a large final project be done using word processing; some students use *Wackford*. Junior Composition, ENGL 303, teaches students to write as required in their professions after graduation. Word processing is common for out-of-class assignments. The forty plus English majors and minors take courses in creative writing, ENGL 283, and advanced composition, ENGL 403,. They frequently use word processing, but rarely use *Wackford*.

All of our writing teachers would like their students to enter their classes knowing all that is needed about computers in order to use them for word processing and to use *Wackford*. They would like to simply require the papers in a particular format, and then pass on to matters of logic and rhetoric. In theory, this is possible since there is a course required of all students, CSC 100, Computer Concepts, which is designed to teach all that is necessary to use computers in writing courses. In practice, of course, writing teachers must at least review how to do word processing and how to use *Wackford*. My sections of Freshman Composition meet one class period each week in a computer lab; at the start of a semester, I use this period to review computer mechanics and urge students to practice them. After a few weeks, no further instruction is needed from me, and the class is used for peer editing.

Hardware and Software

Currently, our hardware is an IBM 4361, model 4, mainframe (used exclusively for academic computing on our campus). Students can use 3278 and 3178 dedicated terminals. Nearly all of the microcomputers (mostly IBM and AT&T) are networked using IBM's *Token Ring*; the mainframe can be accessed through the network.

The operating system used on the 4361 is VM/SP 5.0. At one time, students entered, edited, and printed their papers using XEDIT and *Script*. For the last year or more, students have use *DisplayWrite* 370. SENDFILE and MAIL are used by students to send papers to their instructors, and to send papers to other students for peer editing.

Wackford is a compiled SPITBOL program that runs on the 4361 as its own disconnected machine. *Pipchin*, *Guppy*, and other programs used for composition and literary study are also SPITBOL programs.

Since *Strongwriter* is now available for MS-DOS microcomputers, we have discussed doing all student writing on MS-DOS machines. The campus standard for word processing is *DisplayWrite 4*, but we in English would rather use *Microsoft Word*.

The Program's Effect on Students and Faculty

During the 1986-87 year we started a study to compare the writing of three groups of students: (1) those who used the mainframe and *Wackford* and were given specific instruction in such use, (2) those who used microcomputers and were given specific instruction for their use, (3) and a control group who wrote any way they wanted and were given no instruction in computer use. Due to financial exigencies, we were forced to abandon the study before we had intended, and the information collected was insufficient to form any conclusions. We hope to continue the study in the future.

Instructors whose students have used the *Wackford* cluster of programs report that students do more revision and produce more sophisticated, more thoughtful writing than without it.

We who teach writing at Dakota State College believe that students can write better, and can revise much better, using computers and word processing. We also believe that grammar and style checkers like *Wackford* and *StrongWriter* can be of significant value, especially when they are used by students who have been taught how to make the most of them.

Points like these are difficult to demonstrate to skeptics (especially those who have never used a computer), but as the National Project on Computers and College Writing will, we trust, show, computers have had a revolutionary impact on college writing.

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EASTERN CONNECTICUT STATE UNIVERSITY
WILLMANTE, CONNECTICUT

At this four-year state university, which emphasizes undergraduate education, the writing program requires word processing in freshman composition and optionally includes it in basic and advanced writing courses. The lab has twenty-two dual-drive Zeniths, one hard disk model for the instructor, seven NEC Pinwriter printers, and a video display panel used with an overhead projector. Students purchase the Prentice Hall College Writer, which has a split screen option for instructor comments or for viewing the online handbook. Webster's New World Spelling Checker and William Wresch's Writer's Helper are also available.

History of the Program

For three years (1984-1987) ECSU's English Department conducted a pilot program that combined word-processing with freshman composition. Interested instructors attached a one-credit word processing lab to their sections of freshman writing. The number of labs varied from two to five sections of freshman composition. Instructors encouraged revision, peer editing, and research projects that used a bibliographic bulletin board called *Research Master*.

Our class size for composition courses is limited to sixteen and under the system of attached section and lab, we had access to twenty-three computers and eight printers. As we were unable to expand the hours in which we could schedule classes in that particular lab, we readily accepted the administration's offer to transfer our word processing sections to a new lab in the University's Learning Center, which contains twenty-two computers and six printers for the students use. We were given a generous time allotment for using the lab, and in an attempt to open up more sections of word processing, we divorced the labs from any particular composition section. This separation, unfortunately had an effect opposite to what we had hoped. Many of our students conservatively chose not to take the one-credit word-processing lab once it was optional, this even though they had enthusiastic reports from those students who had completed the course. The separation also presented the problem that with only some students from each composition section taking word processing, we did not see as much interaction between the writing process and the word processing as takes place when the same instructor works with the same students in both areas.

During the summer of 1988, the English Department's Writing Director worked informally with the Learning Center staff to teach word processing to about fifty special admissions students during their six-week pre-college program. These students had a tutor available to them in a room just off the lab, an environment that integrated instruction and word processing, an environment similar to what we had found when we had combined word processing and composition under one instructor in our 1986-87 pilot program.

In the spring of 1988 the English Department had already passed a motion to make word processing a required rather than an optional component of freshman writing. All sections now meet with their instructor in the lab for one class every other week. A lab assistant is present as technician and trouble shooter, allowing the faculty person to concentrate on the student's writing and revising on the computer. Students are required to work in the lab for an assigned number of hours between class sessions. In addition a computer is available for student-teacher conferences in the English Department building. If well-coordinated, this arrangement should allow us to use word processing very effectively as a tool in developing our students' writing skills.

The Relationship of the Program in Computer Writing to the Department's General Approach to Writing

Our English Department supports the writing program through commitment of staff and willingness to experiment with new techniques and formats for teaching writing. All full-time members of the Department teach a minimum of one composition course a year; some routinely teach two sections of writing a semester. In other words, we do not abandon freshman composition and other lower-level courses to adjunct faculty. We also have a series of upper-division composition courses (Business and Technical Writing, Writing for English Majors, and creative writing courses in both fiction and poetry). The Department devised an experimental seven-week writing course, produced a text to use with this format and set up cooperative programs with the library and the Learning Center (which handled basic skills course). We constantly review and try to improve our writing program. Our incorporation of word processing is only one of a series of strategies adopted to help our students to write well.

The instructors in our word-processing labs teach the students only those elements of word processing that they need to know in order to produce the type of papers they will write in college. We emphasize the potential for making major revisions that word processing affords. Our thrust in freshman composition is on revision and writing as process; therefore students come to lab already aware of the value of revision. The lab instructors also use the computers for sentence combining exercises, for grammar review and remediation, and for organizing and analyzing essays. Several instructors instructors use the computer as a means of unifying the class for collaboration on a group research project.

In the 1988-89 academic year about 300 freshman will have used the micro-computer lab for class sessions and to produce their papers. The honor section for expository writing is hoping to make use of it, and Business and Technical Writing will hold classes there. We would like to offer a separate section for those students who wish to learn to write papers on a computer, but are not eligible for the courses that include word processing; as yet, however, we do not have the staff for this. As mentioned, the special admission students use the lab in the summer in conjunction with their basic skills training.

Classroom Practice

Writing instructors are given a general syllabus that contains suggestions for a series of profitable exercises: finding a topic and the support for it via a query program, combining sentences (both from handouts and the students' own papers), reorganizing essays with block movements, using the spell checker, cleaning up finished essays and formatting them attractively, and analyzing essays with the aid of a computer program. As mentioned, the students meet as a group once every other week and may meet with their instructor for conferences that include work on the paper on the computer.

Hardware and Software

In the former lab we had twenty-three DEC Rainbow 100's and eight LA 100 printers available to us. The students used Micro-Pro's version of *WordStar*, for which colleague Judith Y. Heald and I wrote a manual that was adjusted to students needs. In the present lab we have twenty-two Zeniths with two floppy disk drives plus one Zenith with hard drive for the instructor, Kodak Data-Show for use with an overhead projector, and six NEC P7 printers. During the 1987-88 academic year we used the *McGraw-Hill College Version of WordPerfect* for word processing, Language Art's package of programmed grammar instruction, and William Wresch's *Writer's Helper*. In the 1988-89 academic year we will again used *Writer's Helper* but we have selected *The Prentice-Hall College Writer* as the word processor for student use. We chose this program because (1) it is coordinated with the *Prentice-Hall Handbook for Writers*, which we also use and (2) because this program is more powerful than McGraw Hill's limited version of *WordPerfect* and has a split screen function for comments by the instructor. We are reviewing other software, but have not yet reached a decision on further selections.

Effect on Students and Faculty

We have found that students develop a positive and professional attitude when encouraged to prepare their papers with word processing. They show a greater willingness to accept corrections, a greater willingness to ask questions and a willingness to engage more spontaneously in peer editing. While we are aware that teaching word processing and composition together does not magically produce good writing, those of us in the program have found it a major aid that does produce students willing to write. Now that all freshman composition students will learn word processing, we hope to capitalize on the increased professionalism that skill in word processing fosters in students and upgrade our standards for papers. Those faculty who have participated in teaching word processing to students are convinced of its benefits not only for the student, but for the instructor. Faculty often mention improved teacher-student relationship and greater ease in correcting papers, but the most important benefit may well be that a writing instructor working in a lab becomes much more aware of and involved in the individualized writing process by which each student produces papers. When the essay appears on the screen while being written, the instructor can more easily isolate problems and strengths and assess writing habits than when the student is writing on paper.

The use of the computer-aided instruction and word processing in composition courses is expanding rapidly. There has not yet, however, been enough hard research nor a wide enough dissemination of the results of what research has been done. We need to know more about effective methods for using this powerful teaching tool. We need standardized, large-scale experiments on the way it influences student writing. We need reviews of composition-related software. Finally, we need regular forums that focus on this specialized category of computer use.

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EASTERN OREGON STATE COLLEGE
LA GRANDE, OREGON

This small public liberal arts college offers many of its writing courses in the computer lab, and others with the computer lab for student use outside of the class. The lab uses a range of hardware (Apple, AT&T and Zenith) with the word processors WordStar and WordPerfect.

Her/His-story: "Where Did Those Computers Come From?"

Teaching writing on computers at Eastern Oregon State began as the happy intersection of faculty growth and the regional mission of the College. Fortunately, Lois Barry (of our writing faculty) attended the first NEH-funded University of Iowa Institute on Writing in 1979. After exploring the new paradigm of process writing, there, along with twenty-one other writing program directors from across the country, she returned to Oregon better ready to take advantage of the short course offered faculty on our campus in computer literacy.

Even though some writing has been taught on word processors for about ten years, most activity is more recent. A few Kaypro computers had been used to tutor students in need, but nearly a dozen had appeared along the walls in the basement of the library by 1984. There is some disagreement whether Professor Barry actually asked, "where did those computers come from?" The answer seemed less important than the fact that they were there. Within a year, Professor Barry was meeting the members of her composition classes outside of class time, to give them a two-hour lesson on how to get their papers on disk on these machines, using *WordStar*. It was not long before the seemingly inevitable happened: these students spent more time writing, enjoying the ease of revision and taking new pride in their more legible and presentable texts.

While this success partly emerged from the practical goal of avoiding scribbled papers, it was welcomed by a college with a regional goal of serving rural students with sometimes minimal writing skills. Nestled between the Blue and Wallowa Mountains in the northeastern corner of the state, Eastern Oregon State College is a small liberal arts school (1,550 students) located in La Grande (population 12,092). Aided by its Regional Services Institute, the Division of Continuing Education and Regional Programs and its fifty-year history of also being a teachers' college, the school serves 42% of the state (everything East of the Cascades). Many students are basic writers not yet ready for freshman composition, and most now respond enthusiastically to "catching up" through writing on computers. Professor Barry, now joined by several colleagues, teaches some writing courses exclusively on computer.

Carrying a Chip or Two: The Marital Spats of Theory and Practice in Computing

As previewed above, computers have both practical (e.g. more legible texts and quicker revision) and theoretical benefits. At least a majority of us teaching writing, here, aim at the shift away from "product" (which emphasizes producing an error-free document as soon as possible) to "process" writing (which involves brainstorming, invention, peer responses and multiple revisions). We are hardly unique in putting this philosophy into practice through a holistically-scored Writing Proficiency Exam (which must be passed by all graduating students), reduced class-size (especially for basic writers), small-group collaborative learning (where language is seen as an act of social, as well as cognitive, construction), one-to-one conferencing, individual and group peer tutoring (through the Writing Lab and Learning Center), careful advising, peer counseling and peer mentoring.

Nevertheless, we are somewhat unusual in having (finally) a very active and co-operative Writing Lab and Learning Center that are powerful when combined with a high (twenty to one) student/computer ratio. At least two-thirds of our students presently enroll in one of the entry level computer courses, that include word-processing. By the beginning of Spring, 1988, every student in every writing course (approximately 250 students) participated in an introductory workshop conducted by the Writing Lab. The largeness of the programs 1,382 half-hour tutoring sessions delivered to 280 different students during the 1987-88 academic year by twenty trained peer tutors (per quarter) and five English-Writing faculty in the Writing Lab (now two years old)--is surprising for a small, state-supported regional school.

Similarly, the Learning Center (which was created by a federally-funded Title III grant in December of 1986) kept its thirteen student computers smoking with 16,967 hours of use (an average of 81 hours a day) during the 1987-88 academic year. It also trained thirty peer tutors (per quarter), who offered 270 hours of group tutorials in supplemental instruction during the past academic year. By the fall of 1989 the already close working relationship of Writing Lab and Learning Center should improve further when they move into a shared area in the new $8.5 million classroom building.

In spite of this alleged consensus of approach and hefty support, some students and faculty are "carrying a chip" about having to use computers. When basic writers are guided toward writing to learn by the initial presentation of the computer as a simple toy (rather than a scary machine), their resistance usually disappears quickly . Faculty often see through this, realizing that the computer will also be a complex tool, and probably take a significant investment of time, at least in the beginning. Therefore, while they move into computer use more warily and slowly, they usually become frighteningly dependent upon it further on. They exchange a "historical or aesthetic chip" for a "micro-chip."

Hair-Pulling Psychologists, Pacing Philosophers, Humming Musicians, Hand-Writing Economists and Table-Tapping Historians: The Kaleidoscope of Computer Users

As mentioned, most students at Eastern Oregon State already learn word processing outside writing courses. Furthermore, the push for writing across the curriculum has resulted in: 1) regular workshops of faculty on how to include writing exercises in subject matter courses; 2) a requirement that any general education course include a significant writing component; and 3) a college-wide graduation requirement mandating that students complete a minimum of two upper division "writing intensive" courses in their major. All this writing means more instructors demanding more typed and polished manuscripts; this, in turn, means more computer use. The sub-title above is a reminder that computer users include faculty and students from all disciplines (and with varying personalities).

The computers are used by students at all levels, as well. There are about six sections of Basic Skills of Writing, and twelve each of Introduction to Expository Writing and Expository Prose Writing (or freshman composition) taught each year. While only several of these are delivered exclusively as Computer-Based Composition (CBC), nearly all involve significant Computer-Assisted Composition (CAC). Advanced Expository Writing is also CBC, while almost all literature classes are CAC (with students spending long hours writing on computers outside of class). Regular workshops through the Writing Lab move students along through computer skills as smoothly as possible. The Computer Science Department is assisting as well, by breaking down computer courses into four-week modules (e.g. of *WordPerfect* without spread-sheet or database).

Do What I Do, Not What I Say: What Actually Goes on in Our Computer Writing Classes

CBC classes are taught almost exclusively in the computer labs on campus. Even though each student has his own computer, many, at all levels, often work with a partner (who may change frequently) next to them on the desk extensions between computers. Sometimes students are asked to move to another student's computer, read his/her document and type in comments. Some labs have all the computers facing the teacher, while others have computers in a circle facing out (which means students turn their chairs around and face into the circle for class discussion). Writing classes taught on Learning Center computers also have the advantage of adjourning to round tables in the adjoining room for discussion of papers, etc. Writing lab tutors next fall will begin working several days a week in some basic skills and composition classes (which meet one hour a day), to assist students with keyboarding skills or to discuss their papers.

There is a pattern of moving from many shorter daily assignments with fewer revisions (Basic Skills of Writing) to fewer-but-longer essays with multiple revisions (Introduction to Expository Writing). While most writing classes begin with more writing to learn (rather than to be evaluated), the quarter system demands some thorough editing of grammar in hard-copy by about midterm. Many classes require a final best essay that is interesting, well-organized, consciously styled and grammatically correct; teachers often request that students send these off for possible publication. Lois Barry's Advanced Expository Writing --in which students complete six weekly columns, three heavily-revised papers and various explanations of strategy and technique (for a total of well over 10,000 words)--is an excellent example of what we do in CBC. Professor Barry's other regular course, Teaching Writing with a Word Processor, is a fine example of what we do for returning teachers in the area.

While most students are surprised at how fast they can start improving their writing on a computer, many of the problems are technical--to do with memory of procedure. Students soon learn that the computer is frustratingly literal. That is, when we say "wait a minute" in a conversation, we do not really expect our audience to wait a full minute; that, however, is exactly what a computer would do. In other words, we have to get over expecting the machine to do what we do, and be happy that it will at least do what we say. Similarly, we teachers who find ourselves writing twice as much once we take up the computer must learn to be patient with students who do as we do, rather than write a "realistic" amount (as we sometimes ask them to). The new paradigm of process writing ought to let us also reveal that, in spite of plenty of prewriting techniques, some of us are occasionally as stuck as Billy Crystal in *Throw Momma From The Train* (where his character takes months to complete the sentence, "The night was..."). Others of us, now using computers a little more suavely, might want to let students know that we started out in the clumsy tradition of Charlie Chaplin in *Modern Times*.

The Dinosaur's Brains: a Description of Equipment

Hardware: Note below the five labs in three buildings equipped with computers that can be used in teaching composition:

Location:	Computers:	Printers:
Zabel 162	15 Zenith 148	15 Okidata dot matrix
Learning Center	15 Zenith 148 1 Apple IIGS	15 Okidata dot matrix Apple Image Writer II
Ackerman 016	13 Apple, 1 Kaypro	2 Okidata dot matrix
Ackerman 017	10 AT&T PC6300	10 Okidata dot matrix
Ackerman 018	15 Zenith 148	15 Okidata dot matrix

In addition to being used for word processing, some of these machines are also used to teach database management, spread sheets, and computer languages. There are many more computers and eight laser printers for faculty use.

Software: Although a fair amount of composition is done with *WordStar* (especially on the few computers in the dorms), more and more is done with *WordPerfect*. After students have received some peer tutoring, they may be tutored in *Writer's Helper* or *Homer* (for the Apple) for further, supplemental work. Students with severe spelling problems are often put right onto the

WordPerfect Spell-Check or *Thesaurus* disks, with the explanation that they should not become totally dependent on these (because they cannot yet be used for in-class tests in most courses). We have reviewed a great deal of other software, and will probably soon buy more on prewriting and grammar/usage. Having previewed many videos on CBC and CAC, we are just starting to make our own.

While there is quite a bit of campus cooperation with equipment and expertise, hardware and software are very decentralized on campus--the system is a dinosaur with many little brains. We need even better coordination, some centralized access to desktop publishing, and a more publicized understanding of how such desktop capabilities can be tied to our compugraphic and offset presses.

Pandora's Box or The Aleph: the Effects on Faculty and Students of Writing on a Computer

Many faculty and students feel they write twice as much on computer. Writing teachers uninitiated in teaching on the computer and already overloaded with papers, may view the computer as a "Pandora's Box"--threatening an evil flurry of extra work. But most of us quickly realize that the multiple revisions usually made on computer mean more reading and less "correcting." Faculty often say that using computers has improved student writing in their courses immeasurably, and students from their standpoint are likely to agree. Computer literacy is growing faster than new equipment is being bought and installed, and this means that the existing equipment is used almost constantly.

A frequent misconception most faculty and students quickly shed is the notion that--like the all-encompassing globe in Jorge Borges' story "The Aleph"--the computer should hold an infinite pool of ideas for writing. Instead they learn that, as poet Charles Olson would put it, "all thought is selection"; the computer must aid, not overcome, the steady flow of choices made in thinking and writing.

The Talking Mongoose: Still Hunting the Importance of Computers in Writing

It should be clear from what we said above that computers are here to stay and are of growing importance in teaching writing and other subjects on our campus. Because we have been careful to keep human contact increasing in our use of computers, we feel good about using them. Many of us would feel less sanguine if students conversed only with that lizard, their monitor.

Trying to project the future of technology is a good place to be brief. The present is enough of a chameleon, even if it is our sense of the past that changes most. Will "talking computers" replace the keyboarded machines we now use? Japanese still-photo telephones are about to go on the market, but many of us have learned to be hesitant about extreme predictions, for example, Marshall McLuhan's prediction that, by now, the printed book would be dead.

Would a talking computer be better, or just different? Part of the answer will be had by watching talkers like David Antin try to figure out what a "talk" should look like (if you believe that our culture will remain more visual than oral/aural). Part of the history of computers already turning into mythology would involve the memory of Norbert Weiner, by his own account in *Cybernetics*, inventing his computer after watching a mongoose kill a cobra by using its more highly-developed nervous system. Ironically, when a computer is out of control, it is said to be "hunting." Like Weiner, we might ask, as we hook up our latest gadgets: Is an involuntary "hunt" (without first a continuing re-evaluation of needs and values) for "stronger" technology really a "human use of human beings?" If not, we are going to stay busy.

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ERIE COMMUNITY COLLEGE NORTH
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This program, at a suburban branch of a three-campus community college, offers two levels of developmental English in a laboratory housing forty IBM PC's with hard drives and printers. An English drop-in lab has an Apple IIe, two Apple IIgs and an IBM clone with printers. The Drop-In lab has the English Microlab drill series, AppleWorks, and PFS: Professional. The larger lab has PFS: Professional, WordPerfect and other word processing programs. User-friendly PFS: Professional, with its spelling and synonym checkers, has proven helpful for developmental students.

History of the Program

Erie Community College North houses both the Data Processing and Computer Science Departments and these Departments, of course, helped seed the College's interest in computers. In addition, the staff of the Secretarial Science and Business Departments developed an early interest in both word processing and popular programs such as Lotus 1-2-3. Before microcomputers were introduced to the campus, prime terminals were available to students and faculty. Departments in the technologies created small microcomputer laboratories for their students. The library made a few prime terminals and Apple computers available to the entire campus.

Microcomputer use on campus received a boost when ECC North acquired an IBM computer laboratory through a three-year Title III project. Specific departments were earmarked for time in this laboratory, which houses approximately forty IBM computers and printers. Networking facilities were also set up in this laboratory. The English Department was one of the departments that participated in the Title III project for a period of one year. My EN 020 (basic writing) students used the lab during this time. The Title III project enabled the campus to acquire computers and software and to offer training seminars for faculty members. I personally taught seminars in *AppleWorks* and *Bank Street Writer*. I have also headed the Computer Committee in the English Department. For the past three years, my students have used the computer lab for approximately five weeks out of each fifteen week semester.

Reaction of Faculty Members and Students to Microcomputer Laboratory Use

Although most members of the English Department at ECC North have some familiarity with computers either because they attended seminars on campus, own computers or took computer courses in graduate school or elsewhere, I am the only member of the Department who uses the computer lab on a regular basis. Some members of the Department took one of the seminars I offered. This reluctance might be explained by the fact that it is difficult to obtain laboratory time for classes. The recent opening of another microcomputer lab for Secretarial Science/Business students will help relieve this congestion. In addition, some faculty members are not convinced that the use of the computer enhances writing instruction or improves the quality of student writing. However, the recent acquisition (for an English Drop-In Tutorial laboratory housed in the library) of two Apple IIg's and two IBM clones with printers, as well the English Microlab series and a number of spelling checker and word processing programs should break down the barriers to computer use. Instructors and tutors will be able to work with individual students, and the computers are now in a setting that is not as threatening as a large lab.

My basic writing students have had varied reactions to the use of the computer laboratory. Every basic writing student who has used the *English Microlab* series in the English Drop-In Lab has sung the praises of *Microlab*. I had several students take the *Microlab Quick Diagnostic* check to ascertain their skills levels in discrete areas of grammar. I have suggested to the administration of the College that an objective segment such as this be added to our pre- and post-tests in the area of English--either on computers or in paper-and-pencil form. Students who took the Quick Check were more willing to face an assessment of their writing skills than students who heard an assessment from a teacher. Whether or not students enjoy prewriting, writing and revision tasks when they were asked to do these things on computers as a class depended in large part on their typing skills. For the composition component of my final examination, students were given the option of using the computer or working with pencil and paper. All students had received training in class on a simple word processing program--*Bank Street Writer*. Approximately 40% of the students taking the exam chose the computer option. Students who enjoyed using the computer said that revision was much easier. They also liked the idea of being able to print multiple copies.

Relationship of Computer Writing to a General Approach to Writing

Before I used the computer to teach developmental composition, like most instructors, I divided the semester into discrete chunks in which discrete clusters of information were dispensed. I began to think of writing as a process when I began using the computer with my students. I field-tested the integrated program *Quill* with a select group of my students for a professor at the State University of New York at Buffalo. *The Quill Planner* sets up a dialogue between instructor and student even before the first draft is written. Through examination of other integrated packages, I began to realize that I had not placed enough emphasis on prewriting and had never integrated the process of writing with grammatical concerns. My partner, Dr. Agnes Webb, and I have completed the written component for an integrated software package that combines several prewriting segments, word processing and word usage/punctuation checkers. Our package stimulates the production of ideas and encourages students to focus their attention on revising their work only after they have done a considerable amount of writing. Help screens are available to them so that they can make decisions about their own writing. When students use a powerful machine such as a computer, they develop a feeling of mastery. When they start to make decisions on how their work can be altered, they start to feel that they can control the writing process and they start to enjoy writing more.

Number of Students and Types of Courses that Utilize the Computer

Five of my sections of EN 020 (basic writing) use the IBM computer laboratory on a regular basis. (There are twenty-five students in each section.) In addition, varying numbers of students use the *English Microlab* series (as well as other software packages) in the English Drop-In Tutorial Lab.

Division of Class Time

The students in EN 020 spend five weeks of each semester in the IBM lab. The time they spend on the computer is divided in the following manner:

1. Prewriting exercises and outlining of a paragraph of descriptio
2. Writing and revision of paragraph of description.
3. Writing and revision of cause/effect paragraph.
4. Production of a three paragraph problem-solving essay.
   This assignment is divided into the following segments:
   a. Problem question and possible solution
   b. Refutation of possible solutions
   c. Selection of the best solution with reason why it was selected
   d. Production of body paragraph, introductory paragraph and concluding paragraph
   e. Essay revision
5. Computer time for final exams essays.

In addition, I hold all my office hours in the Drop-In Tutorial Lab, and I encourage my students to use *English Microlab* and other drill programs to strengthen their grammatical skills.

Hardware and Software

The IBM laboratory houses approximately forty IBM PC's with printers. This is the laboratory that is available to the entire campus. It is used primarily by teachers in business, food service, secretarial science, data processing, and English. However, a data processing, secretarial and business microcomputer lab has recently been established on campus. This lab contains IBM clones with printers. The Drop-In English Tutorial lab has two Apple IIc's, one Apple IIE and two IBM clones--all with printers. In addition, a Sperry Lab is maintained by the Computer Science Department. Prime Terminals are available on campus, and several technical divisions have small microcomputer labs.

Several software packages are available to the English Department. *AppleWorks*, *Bank Street Writer*, *PFS: Write*, *Sensible Speller* (Spelling Checker), *Quill* and *English Microlab* have all been used by my students (*PFS* to be introduced to them in the future.)

In addition, through both Student Government money and a Perkins grant, computer peripherals (such as key guard, voice synthesizer, Braille edit) and software packages were purchased for the disabled student population.

Program's Effect on Faculty and Students

The most conspicuously successful use of the computer with my students has occurred with the use of *English Microlab*. The *English Microlab Quick Check* gives students an overall score (after they have completed a fifty question grammar and usage objective test) and breaks this score down by specific category. Student know at a glance their specific strengths and weaknesses and use only the disks they need. This approach not only frees the instructor to assist with composition writing, but it individualizes student instruction so that students do not have to wade through material they already know. In addition, even students who have poor or no typing skills can use this program.

The use of simple word processing programs and prewriting exercises has helped my students overcome writer's fright more successfully than any other strategy that I have tried. The use of the computer lab has made the writing process a collaborative effort between instructor and student, instead of the old I'll-tell-you-how-to-do-it-and-then-you-will-do-it approach used traditionally. Computer use has two other advantages: at long last I can *read* papers. In addition, the use of spelling checkers eliminates the distracting spelling problem.

Although almost all my students (even the poor typists) have been willing to use the computer, an occasional student will not even touch it. This type of student (though rare) tends to resist any approach that does not duplicate what he/she has done in the past. Only 40% percent of my students chose the computer option for the final exam essays. I am convinced that once students have a keyboarding module available to them more students will choose to use the computer for essay writing purposes.

Although the faculty members in my department have been reluctant to use the computer for composition instruction, they are being nudged in that direction not only by the administration, but also by members of technology departments on campus who believe that something has to be done to raise the composition skills of our students, and the computer is the way to develop those skills.

Historical and Intellectual Importance

I am convinced that, in the future, paper-and-pencil compositions will become obsolete. Many of our entering freshman arrive at our institutions with well-developed computer skills. It remains to convince those composition students and faculty members who have been reluctant to use the computer that computer use not only increases the number of pages written but the quality of those pages, as well. The computer is a versatile tool that lends itself to any writing style. It can be used to build discrete grammatical skills (and in that capacity can be used by typists and non-typists alike). With the assistance of prewriting exercises, checkers, and attentive instructors, the computer can help students produce written work that is logical, organized and relatively error-free.

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This campus of a medium-sized private university offers sections in basic writing and freshman composition in three facilities: a classroom of twenty AT&T 6300's linked by an IVAN interactive system; a room in the library with fifteen AT&Ts with hard disks and telecommunications connections; and a Learning Center with twenty networked IBM PC's, all using NewWord as the standard word processor. For research papers, students conduct online bibliographical searches of Dialog using Smartcomm and may make use of text managers like NoteBook II and GoFer.

The use of computers in writing at Fairleigh Dickinson University's Florham-Madison campus began inauspiciously in 1983. That fall, to encourage development of computer-aided instruction, the campus administration furnished several departments with Apple IIe's. Despite our interest in developing our computer literacy, our Apple sat on the secretary's desk collecting dust for some time because we hadn't known enough when we wrote the request for the machine to order any software. By the spring of 1984, however, several of the faculty had bought their own machines (Kaypro 2's) and were soon merrily debating the merits of *WordStar* vs. *AppleWriter* vs. *PerfectWriter*, much to the consternation of colleagues not yet bitten by the computer bug. Those of us who were using the computers became convinced that, despite the difficulties of the software and the glitches that occurred, which often took longer to untangle than the process of retyping a page would have, we needed more of these machines around for our students in freshman composition.

University resources were a bit strapped--when are they ever not?--but New Jersey's Department of Higher Education (DHE)) had for some years been offering grant support for integration of computers into the curriculum, so we made our first attempt at writing a grant and were unsuccessful. A year later, more proficient at the software and hardware, more schooled in developments around the country from reading articles and attending conferences, we resubmitted our grant--and received sufficient funding to outfit a computer laboratory with twenty computers and ten printers. At the same time, our Learning Center staff also wrote a grant and got funding for machines for their writing labs. Within a short time, thanks to the generosity of DHE, we had made a major leap forward. In the summer of 1987, we successfully wrote a follow-up grant to expand our efforts by adding fifteen more machines and developing our program to move beyond word processing into text-searching and use of online databases.

Initially, most of our department colleagues were either indifferent to our efforts or at the worst only mildly hostile. One or two expressed the opinion that they wouldn't be caught dead teaching "typing," but even they congratulated us on our grantsmanship and sat back to watch. Student reaction was predictably more enthusiastic, although in the first semester of our program, when students were not aware that they were going to be learning word processing along with their writing, some burst into the chairperson's office, often in tears, claiming incurable computer incompetence.

Both faculty and student attitudes changed very soon. By the end of the first year, almost all the full-time faculty were making use of the computer we installed in the department office at least for their own writing, and were marvelling at the miracles of text manipulation they could perform. The incurable computerphobes among the students turned out to be a small number, as our surveys showed overwhelming acceptance of computers in writing. The enthusiasm placed a strain on campus computer facilities more quickly than we had anticipated. It would be inflating our approach to the use of computers in composition to speak of an instructional "theory " lying behind it. Essentially, although our department nominally adheres to the process approach to writing, what this means in practice is an anarchic eclecticism of methodologies. We attempt to elicit as much writing and revisions from students as possible by whatever means available. Our initial goals for integrating the computer into freshman writing were thus on one level very modest. In our grant proposal, we suggested that we would introduce students to the word processor in a session or two and then just have open lab-time when they could write their papers and do their revisions.

However, one of our instructors attended a summer institute on using computers in freshman writing while we were waiting for the decision on our grant, and she returned a convert to the computer as an essential not a peripheral tool for teaching writing. She suggested--perhaps that's too mild a characterization--that classes should meet in the computer room at all times so that students could do all their writing on the computer to use the technology effectively to enhance the writing process. In her view, the computer was the *only* way we could encourage students to regard writing as a process. After a brief struggle with the computer center folks--who took proprietary control of "our" room and who coveted it for their own use--we scheduled sections taught entirely on the computer. And that is the model we have tried to follow, more or less, depending on the commitments and skills of those available to teach the sections.

Our project had its grandoise side as well. We had been looking at some CAI packages like *HBJ-Writer* and William Wresch's *Writer's Helper* and proposed incorporating these tools into our instruction or at least exploring them in more depth. Ultimately, we decided against using much CAI because we found the packages, however well thought out, not fully compatible with our teaching styles. We were also considering the possibilities of using database software like *Notebook II* for the research component of our year-long freshman writing sequence as well as using the online facilities in the library--then in a rather primitive state. So we wrote into the grant some machines for the library in addition to a rudimentary desktop publishing set-up for our advanced course in journalism and communications. While the DHE reviewers knocked the desktop publishing out of the grant, they allowed the library machines and the database software. This component provided the focus for our second grant.

We had had visions of students using database managers like *Notebook II* to keep track of their reading and notetaking, and we saw their mastering the logical structures of online reference systems and stand-alone databases as a powerful heuristic to teach the analytic skills students need to do good research. But not much of this happened initially. We did set up two PC's in the library, and then spent a lot of time examining the advantages and the disadvantages of a number of approaches to teaching online searching: whether to go with front-end packages that automate or simulate the process of searching or to teach working through a commercial system directly. Finally we decided on the latter approach and opened a classroom instructional account with Dialog, the major commercial vendor of online databases, and introduced lessons in searching along with our standard library orientation.

We also began exploring text-searching programs like *Zyindex* and *Gofer* and free-form databases like *Asksam*. The Pedagogical value of these programs lies in making students more conscious of the process by which information is analyzed and assembled. Most of us are familiar with the typical student research paper--a compilation of quotes and paraphases (often indistinguishable except for the absence of quotation marks in the latter) that have not been fully thought through. Despite generations of textbooks teaching students how to organize note cards, the products many students turn in do not reflect much thinking about what they've read. Using a text-searching program like *Gofer* (the program we finally chose) might, we thought, be a useful tool to teach more dynamic and rational thinking.

We projected phasing in word processing to all our freshman Writing Workshop courses over a three year period. Now that that period is almost up, we are only about half way there. But while full integration of the computer has yet to occur, students can't be kept away from the computers to write papers. Students coming through our developmental program are introduced to the computer in their weekly writing labs in the campus Learning Center. Some instructors in non-computer sections of Freshman Writing Workshop have made use of the free lab time to introduce their students to the computers and software, and many students have just learned on their own. Thus, although about 150 students a semester have been through a formal computer writing course since the fall of 1985, many more have received some of the benefits of having computers available. At the same time as our computer writing project was developing, a writing across the curriculum effort centered in our new University Core sequence began. Introduced last year, this four course sequence focusing on significant ideas was designed with major writing components in each course. Students do weekly journals and major papers with extensive revisions built into the assignments. The availability of word processors became the students' salvation; a recent survey of students in one core course showed that 80% were using computers to do their assignments.

Use of the computer in different sections of Freshman Writing Workshop varies depending on the instructors' level of competence with the computer and their ingenuity. Our most computer-oriented instructors use the computers at all times. In EN101 this involves introducing the students to the software indirectly by way of writing exercises (freewriting assignments at the beginning, writing longer papers later, brief note-taking sessions throughout the semester, revision activities, etc.). These activities teach a basic but limited repertoire of computer functions (opening a file, simple cursor moves, blocking, moving, saving, printing) at the same time as they teach the essentials of writing (brainstorming, defining a thesis, organizing, drafting, editing, redrafting). The instructors combine writing on the computer with peer-group activities to encourage revision. Students swap disks to read and comment on each other's papers. Some papers are edited collectively using the limited networking facilities of the computer class (see equipment discussion below). Using the search and replace functions of the software, the instructors teach the students about stylistic choices (one instructor has her students search for all the uses and variants of *is* to make the students aware of the passive voice). This same instructor uses the boldfacing and underlining functions to make students aware of topic sentences, transitions, or whatever else she wants to highlight.

In EN102, the second part of our year-long sequence, we focus on developing longer, documented essays. We introduce students to standard library research as well as to some limited first-hand data gathering through interviewing and simple surveys. In the early part of the course, students in the computer section might, for example, use the computer to write and save summaries of their reading. One instructor requires each student to track stories in the *New York Times* and to compile summaries of twenty articles. These summaries are then copied into a large file on the hard disk of the instructor's machine and the students in the class, using a text-searching program like *Gofer* or the search function of the word processor itself, can search and download summaries related to their own topics. To prepare the students for more extensive searching on both printed and online indexes and bibliographies, we teach about indexing terms and subject headings and have students use them in class database. Later in the semester, after a traditional library orientation and an exercise in searching printed indexes, the students learn Dialog searching. They then write a search request and run it under the supervision of the reference librarians. Throughout the semester, of course, the students use word processing to assemble their information into drafts, to revise and to edit the final products.

Our computer writing labs consists of twenty AT&T 6300 computers (dual disk drives, 640K memory) and ten printers and one AT&T 6300 with a 20MB hard drive as the instructor's terminal. The lab was originally planned for stand-alone computers, while our colleagues in the Learning Center were plunging ahead with a networked arrangement. We soon found out the limitations of our stand-alone set-up for demonstrating the various writing and word-processing techniques. The overhead monitors we had installed in our computer room for demonstration purposes were just not readable, and, of course, whatever was displayed on them couldn't be worked on by anyone other than the instructor. We also wanted to find a way for students to be able to pool their materials in research to create collective databases without the instructors' having to copy files onto the hard disk. After exploring the arcana of local area networking and being a bit staggered by the complexity of LAN set-up, costs, and maintenance--even with the help of our resident experts in networking in the Learning Center--we opted for what I call a "quasi-LAN" approach. A computer dealer--a former colleague--introduced us to IVAN, a partially interactive system that allows instructors to transmit anything on their screen to every screen in the room or to retransmit anything on any given screen to all the others. We also are in the process of setting up a campus bulletin board system that would allow the students to pool their work and to establish an electronic mail network.

In the library, we now have fifteen additional AT&T 6300's, two in the periodicals reading room and the rest adjacent to the reference department. Two of these are attached to modems for online searching. These machines have 20MB hard drives.

The Campus Learning Center has eighteen computers (original IBM PC's) hooked into a network served by an IBM-AT with an IBM-XT as printer server. For our word processor we chose *New Word* 2.17, a cheap but slightly improved clone of *WordStar* 3.3 , because all of us involved in word processing in the Department at that time had learned *WordStar* pretty well and it seemed the easiest route to follow--especially since *New Word* allowed simplification of *WordStar's* more complex keystroke sequences via the function keys. Most everyone--students and faculty--have found it reasonably easy to learn despite *WordStar's* reputation for difficulty. At the present time we are trying to decide whether to upgrade to *WordStar 5* or go along with a request from the Computer Center to make WordPerfect the standard University word processor (it runs on the various mainframes and minicomputers the University has as well as on the PC's, while *WordStar* does not).

To assess what qualitative differences word processing might have made in student writing, we followed a procedure developed by Gifford and Dean of the University of Wisconsin--Stevens Point. We took a random sample of papers written for our Department's proficiency examination--both handwritten papers and word-processed papers--had them all word-processed, errors and all, and submitted them for reading by the faculty not involved in the word-processing instruction. We asked for a more detailed grading of the papers than we usually use in our holistic proficiency scoring, requesting readers to evaluate the papers on a five-point scale in eight different categories. We then calculated the average over-all scores on the average scores within the categories. Our initial round of readings showed a slight advantage for the word-processed papers. A second round of readings of these same papers by three additional readers gave the word-processed papers an even more significant advantage. A repeat of this procedure with papers from this year's examination and another set of readers came up with essentially the same results. The word-processed papers scored higher in general than the handwritten ones and outscored the handwritten ones in a majority of categories. In addition, surveys indicate that students are doing more revision and are finding the task of writing less onerous.

Introducing the computer into freshman composition offers exciting possibilities. As our most committed computer-writing instructor often says, using the computer in freshman writing convinces her that writing really can be taught. At a minimum, computer writing simplifies the generation of text and facilitates its manipulation. Beyond that, the introduction of a new technology gives a task that students generally tend to resent and resist an aura of newness and freshness. Students come to feel that they are not are not just doing the same thing again. Similarly, instructors become more self-conscious about what they are doing and pay more attention to the problems of writing rather than dodging the issues by lecturing on literature or other topics that fill the class time. As one of our instructors noted in his evaluation of our first year of computer writing, he found teaching in a computer room closer to working in an art studio than in an English classroom. Finally, while computer writing draws on the repertoire of methodologies developed in composition pedagogy over the last decade, many of the methods developed in computer sections can be translated back into non-computer terms, thus reinforcing the model for teaching writing as process.

The National Project on Computers and College Writing comes along at a very crucial time. The use of computers in writing is still in its early stages despite a growing body of literature, an increasing cadre of textbooks, and a growing number of schools wiring up. But much of the work has been done in scattered fashion by solitary individuals or groups of enthusiasts within departments and institutions reporting to fellow-enthusiasts through formal and informal networks, and a lot of people spend a lot of time re-inventing the wheel for lack of access to models and solid information about hardware, and software, and teaching techniques. The National Project gives the movement to computers on writing a national visibility and thus will provide a means for consolidating what those of us who have been working in this area have been doing and make it accessible to others. It will, one is certain, confirm what those of us using computers in writing have intuitively, anecdotally, and occasionally empirically documented about efficacy and effects.

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GLENDALE COMMUNITY COLLEGE
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This program sequence at a large southwestern community college is available to basic writing and freshman composition students in a forty-four station IBM compatible micro-lab equipped with two laser and eleven contact printers. Basic writers in a self-paced program use locally-generated tutorial and testing software as well as the HBJ Writer while freshman level students use both the HBJ Writer and the student version of WordPerfect.

It all started for us with an attraction to a place where people were having fun teaching and learning. Visits to the newly opened Business Department computer lab and chats with excited colleagues convinced several English instructors that they were looking at the future. That was back in the fall of 1985.

Thanks to encouragement and support provided by Business faculty, who generously opened up a section of that busy sixty-unit Apple Lab, in the spring of 1986 three Glendale Community College English instructors (Jan Boerner, Diana Balogh and Joy Wingersky) launched us into the world of computers and word processing. The cooperative spirit and unselfishness so often found among computer enthusiasts was abundant in the Business Department's computer lab and a boon to our department's adventuresome trio.

During the same spring, a trip to neighboring Utah provided us with the opportunity to visit a number of writing lab environments as we began plans for our own self-contained lab. Again, we were met with enthusiastic, helpful individuals, who readily shared their experiences with us. In a whirlwind two days, we toured labs and writing centers at Brigham Young University, Utah State University, Weber State University, Logan High School and Boxelder High School. We saw many situations that we liked and some other design and management situations that we knew would surely avoid. The immediate result was a summer planning project, which allowed us to design the layout, decor, furniture, staffing and operation of the new lab at Glendale Community College. Strong encouragement and constant support from our Dean of Arts and Sciences (Dr. Homero Lopez) provided us with the confidence and financial backing we needed for success.

We began the fall semester of 1986 in a very attractive, self-contained setting, which housed thirty-four IBM compatibles, eight Apple IIe's and ten contact printers. The surroundings were entirely pleasant but to be short-lived. We knew that we would be moving shortly into a new, advanced-design building. And so the Department planning committee quickly went back to work, this time in conjunction with faculty from other disciplines to work on a bold, new concept--a multi-purpose high technology facility.

From the beginning, then, the concept of a campus-wide umbrella approach to the use of computers led smoothly and directly to the faculty-initiated design and construction of a 2.5 million dollar multi-discipline High Technology Center, which opened in the spring of 1987. By this time, several more of our English faculty had become interested in the potential of computers within our composition program, giving us a solid core of enthusiasts. At that point, the English Department was clearly a key member of a broad-based team involved in the purchase of software and hardware; the selection, training, and scheduling of a support staff; and the formulation of an ongoing policy for the expansion and development of campus-wide computer-assisted instruction. That faculty dominated computer advisory committee continues its work today, insuring that intelligent use is made of available capital funds, that current software and hardware information is disseminated, and that priorities are assigned for equal and fair computer expansion across all disciplines. From those little visits and friendly chats in the Business Department lab, we had, indeed, come a long way in a very short time.

The new facility, which houses our present writing lab, is equipped with forty-four IBM compatibles, eleven contact printers, two laser printers and one Macintosh with its printer. Our lab director is now a full-time member of the English faculty who is granted released time as compensation for her duties. She also teaches two composition classes each semester to keep in touch with instructional developments. Four lab assistants each work twenty hours per week under her supervision. Several other work study students contribute a total of twenty-five hours per week. Our philosophy from the start has been to keep the lab "open"; students always know that lab stations are available on a first-come basis. "Closing" the lab so that entire classes could be scheduled in has never been considered practical for maximum usage. Presently, 500 to 600 students per week use the lab. In our present location, occasional overflows from the English lab are easily accommodated in the central work room of the High Technology Center, a lowered area roughly two-thirds the size of a football field housing 336 microcomputer stations.

The longest history of computer-assisted instruction in the Glendale English Department belongs to the original group of three instructors who concentrated on the developmental composition course. Using *Magic Window* and their own generated software, they began with two piloted class sections. Since then, they have produced their own manual for the course as well as a source/guidebook for grammar instruction to complement the extensive software they have developed. (A major publisher is presently negotiating with them for marketing rights.) Their students proceed through the grammar instruction in a self-paced fashion, leaving many of them with more time for practice with writing than would be the case in a non-computerized class. All writing is done in the lab, using the *HBJ Writer* software. This fall nine sections of developmental composition will be taught with the computer; an equal number will be taught in the traditional manner. Early registration figures show the computer sections clearly attracting more students than traditionally taught sections. Many of our returning students clearly enjoy assuming greater responsibility for their learning through this self-paced, computerized approach. They keep updated on their progress with a weekly database printout, which also permits the instructors to monitor their activity. Successful completion rates in the developmental course have been gradually improving. This fall, we plan to track developmental students to learn if their experience with the computer course may increase their chances for success with ENG 101.

With several or more instructors of developmental composition often at work in the lab at the same time, many students have begun to feel comfortable with the idea of consulting more than one faculty mentor for assistance with a piece of writing. As a result, these instructors have come closer together in their expectations and grading standards. However, greatest support for developmental students may be coming from individuals who have just come through the course and have immediately returned to work as lab assistants. Their enthusiasm and confidence serve to bolster beginners who may feel intimidated by a lack of writing skills and for some (especially older returning students), the challenge of coping with a microcomputer for the first time.

As we expected, our former developmental students now intend to continue using computers as they enter freshman-level composition classes. This fall, four different instructors will be teaching a total of six sections of 101 designated as computer-assisted classes. Their students will also use the *HBJ Writer*, which most instructors find to be compatible with their emphasis on the process approach to writing. Prewriting and revision components of the software help instructors draw attention to those parts of the process that beginning writers often ignore.

Several Fall 1987 pilot sections of 101 produced favorable responses from instructors and students. Both groups agreed that more collaborative learning experiences were natural outgrowths of computer-assisted instruction in writing. More instructors were utilizing peer-review groups throughout the entire writing process. Students had more opportunity to respond to peer writing and in doing so, gained for themselves a clearer sense of writing for an audience. Since instructors got to see more writing in progress, they were able to intervene at various stages of the process rather than serve exclusively as critic/judges, concerned only with the end product. Using *Data Show*, a system that permits the instructor to project the computer's video onto a large screen or convenient wall, has been a successful means to involve an entire class in acquiring revision skills. With the instructor at the keyboard and taking suggestions from the class, a student's draft (not a "finished" piece) is revised according to peer response. The suggested revisions are saved on a new file, and the student may choose to use some or none of the suggestions when later completing the essay. Students are usually quite willing to volunteer draft versions for this peer-advice session.

Other benefits from our utilization of computers in instruction have followed rapidly. Some not-so-subtle changes have taken place in the English Department thanks to the advent of computer usage. At this point all English faculty have use of microcomputers in their offices. Even some of the reluctant faculty holdouts have slowly but freely joined our ranks. Supplied with the software currently in use in the lab, many of them are gradually finding ways to help their students on an individual basis with the aid of the computer. Communication among faculty is improving. With a new common concern, writing faculty are keeping more in touch with one another. One result I truly appreciate as a department chair is a much more evident cooperative attitude. Thanks in part to the use of new tools and approaches, curriculum changes have been easier to negotiate.

Computers have also helped to break down further the barriers between students and teachers. More and more work in progress is being shared with instructors. There is no doubt in my mind that composition teachers are moving in the right direction--into the role of mentors. One-to-one conferences are much more common as students begin to accept more readily the idea that no piece of writing is ever truly "finished." A sense of teamwork has become more obvious to the student. For example, the teacher and student may use conference or class time to collaborate on strategies to replace a number of "to be" verbs that have been identified with one of the revision programs in *HBJ Writer*. "This one revision check has done more to help produce college-level writing than any other I have used," says Barbara Hackett, our lab director. My own conferences are changing. I have often had students come into the office with disk in hand so that we would sit side by side in front of my terminal to work on a paper in progress. Out from behind my desk, I feel that I am less threatening and more readily received by the student.

As many of these same students have continued into second semester composition, they use the lab individually, as needed, to complete their writing assignments. With the research paper a major element of English 102, many students turn to using the student version of *WordPerfect*, a friendly, word-processing system that permits students to set up a bibliography and do outlines with relative ease. At present, then, we feel comfortable with this situation and will continue to let students rely on the assistance they obtain in the lab as they work at the terminals and then go back to work with their individual instructors, hard copy or disks in hand.

Clearly, students are spending more time actually engaged in writing in a distraction-free environment. For many students at this commuter community college, the writing lab has become a haven of opportunity, where they may find capable tutors and lab assistants along with the satisfaction that comes from acquiring improved writing skills. Barbara Hackett's ENG 101 students kept journals each time they visited the lab this past spring. While some expressed frustrations with software ("That spelling checker just takes forever!"), most were very enthusiastic about their experiences: "I think this computerized class is terrific! I love the way it facilitates the writing process.... "The last fifteen weeks I've learned more than I ever did in high school." Comments which indicated enthusiasm about the language and renewed self-confidence were also common: "I would advise other students to take this class. I have changed, in a way, toward English. I like it much more now. I see improvement in myself." It's clear to me that teaching composition will never be the same at Glendale Community College.

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GREENFIELD COMMUNITY COLLEGE
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This small community college offers basic writing and freshman composition courses; some sections of these have been taught in an Apple IIe lab with twenty-four stations, and some in a Wang mini lab, also with twenty-four places. We have used Apple Writer IIe as well as the built-in Wang system. The basic courses also use a locally developed set of CAI lessons in grammar, based on the x-word approach. We have found word processing to be a powerful motivator, especially for basic writers. We expect by September 1989 to have three word processing labs using WordPerfect with various hardware, especially Data General and AT&T.

Greenfield is a small (1,100 FTE) comprehensive community college in the most rural county of Massachusetts. Our students come from a wide variety of backgrounds, and bring with them widely divergent educational goals. Each year we admit numbers of students with significant developmental needs, as well as several who are viable candidates for the Ada Comstock Scholars Program at Smith College. We have tried to meet the various needs of our students through a program that includes ENG 100 (College Writing Strategies), for those who need additional training in writing skills before taking a full-fledged college program, and a system of options enabling students to fulfill their expository writing requirement through a course best suited to their individual interests.

History of the Program

The English Department's involvement with computers began a decade ago when a member of the Data Processing Department offered a one-credit course called "Talking Back to Hal," in which he taught programming in BASIC. The faculty members who were then engaged in establishing a developmental writing program had been exposed to x-word grammar (a drastically simplified transformational grammar that gives inductive and concrete access to an understanding of the English sentence). As a result of that exposure, I became fascinated with the prospect of writing a series of CAI lessons that would enable students to review individually in the Learning Center x-word grammar material they had previously learned in class. Five years later when I had substantially finished the CAI lessons, I was an avid computer user and eager to try teaching students through the medium of word processing.

Our small college, with limited resources had by that time acquired a considerable amount of hardware and software, primarily for the use of the Natural Sciences and the Business Administration Divisions. I gained access to a word processing lab by scheduling one experimental section of developmental English with a prerequisite of twenty-five wpm typing or enrollment in Word Processing concurrently. As it happened, advisers (including some in the Business Division itself) forgot or ignored the prerequisite, and the resulting class included more than a few students with little or no knowledge of the keyboard. Contrary to expectations, that mattered very little. The great majority of students in the class were positively delighted to be able to print out clean, readable copy and to make revisions without starting over. Those who had to rely on hunt-and-peck typing were equally pleased and, I found, benefitted in an unexpected way. For example, they paid more attention to "what letter comes next" than they were accustomed to when writing in longhand. Further some students in the class had already developed some computer skills and, though perhaps poor writers, were able to help others learn to use the equipment.

I quietly dropped the prerequisite and scheduled additional sections in the lab the following semester. Finding the work with developmental students in the word processing lab to be so satisfying, I gradually persuaded four other members of the Department to learn word processing, not only for personal use, but as a way of teaching writing skills.

We have no lab of our own, and must depend on the good will of the Business Division, as well as on a schedule that allows the Division access to the lab at their preferred hours. We have also been shunted from lab to lab, with differing hardware and software to use, but the enthusiasm of the students who are taught in the lab has helped to produce an atmosphere in which others are willing to accommodate our interests.

Philosophy of our Writing Program and the Relevance of Computers

Our developmental writing course and the standard freshman composition option called ENG 101 (Structures for Composition) have consistently leaned in the direction of process emphasis and collaborative learning. Several who have taught the courses also quite naturally include the one-on-one conference as a technique for helping students work on process. This tendency has been strengthened in the Department since I became a member of Roger Garrison's Seminar staff and, after his death, brought the National Seminar for Master Teachers and the National Institute for Teachers of Writing to Greenfield each summer. Now, several members of the English Department have been trained in the uses of the one-on-one conference, together with collaborative learning, in teaching writing as process. Nevertheless, we have always approached writing assignments with somewhat more structure than is the case in some conference-centered courses. We give the students detailed guidelines for planning, drafting, and revising their essays, and in the developmental courses we insist that students obtain a signature of approval from the instructor or a trained tutor, or a written response from a classmate at as many as eleven stages in the process of writing a paper.

While this philosophy and its application preceded the use of word processing in all our courses, we have found that the word processing lab is an entirely natural setting for conferences and collaborative learning. When each student is seated at a keyboard, it is *more difficult* to teach didactically or to conduct question-and-answer discussions; conversely, it is *much easier* to engage in conferences while students go about their writing, and collaboration among students is unavoidable: they simply look at each other's screens, ask questions, offer suggestions, and in other ways learn together.

Courses and Students Involved

Most of our use of word processing so far has been with the developmental course ENG 100 (College Writing Strategies). We now schedule five sections (100 students) of ENG 100 in the lab each fall and three sections each spring. In Fall 1987 we also made arrangements to give some classes of ENG 101 (Structures for Composition) a week's training in the word processing lab, after which students returned to their regular classroom, but with the expectation that they would use the lab for their written assignments. Five sections (125 students) were included in that scheduling; in Spring 1988, the number was two sections (a computer enthusiast in the Department was on sabbatical). This fall, we expect to schedule four sections of ENG 100 and three of ENG 101 in the word processing lab full time.

Logistics

Class time in the word processing lab is writing time. A few announcements may be made, general discussion may occur briefly, but the students come to write--or, rather, to continue the writing that they have been doing outside of class time, when the lab is open for general use. Each student works individually; although each is expected to complete a given number of assignments by the end of the semester, students work at their own pace. Students print when they need to--when they're ready for hard copy to edit or to hand in. When they need a conference or peer response, they can initiate this too, showing what's on the screen and printing out as needed.

Hardware and Software

Originally, we taught in an Apple IIe lab with twenty-four stations. Three of these, at the back of the room, were attached to high-speed printers. One, at the teacher's desk, was attached to two large-screen monitors, for demonstration purposes. The twenty students worked at the rest. Since the word processing software then in use by the Business Division was *Apple Writer IIe*, that is what we used. Enough copies of the software were on hand to make booting up at the start of the hour a simple business; each student had to keep a personal document disk. The software proved to be easy to learn (and to teach) and there were relatively few problems, except where students forgot to save, or to bring their disks to class.

Later, as we began to put scheduling pressure on the Apple IIe lab, we were invited to use a Wang system lab also equipped with twenty-four stations. Here, however, all the stations are connected to a mini mainframe that gives access to abundant storage and to two high speed printers. Word processing is built in; students have passwords which give them access only to word processing and some relevant utilities, such as a 20,000 word spelling verifier. Students have to learn a somewhat tedious log-on procedure, but then have a powerful but basically very simple program at their disposal.

We are now being asked to return to the Apple IIe lab for our next term's schedule. The software used will be *WordPerfect*, a system which the Business Division has decided to make universal on all its various equipment. While we in English are still learning the particular quirks of this software, we expect that its use will do very little to alter the basic fit that we have found between computers and writing instruction.

The Program's Effectiveness

It is not easy to accumulate hard evidence of the success of one method of teaching over another; that is why we find the new national efforts so exciting. However, we have a measure of student enthusiasm or motivation or what-have-you that at least suggests that teaching writing with computers has some real effectiveness. During the final semester in which some of our sections of ENG 100 were taught in a traditional classroom and some in the word-processing lab, we studied first-of-semester rosters in comparison to final grade rosters. In each of the two classroom sections, taught by two different instructors, fully 65% of the students enrolled completed the course with a passing grade, a highly respectable percentage. In each of the three computer lab sections, one of them taught by an instructor who also taught one of the first two, the comparable figure was *85%*, which we believe to be unusually good.

We believe that the use of word processing has strengthened a program that groped for some time to find the right focus for a process-oriented, conference-based course. Our students and the faculty who teach in the lab are enthusiastic. Now we look to putting some "hard" data behind our beliefs. The CUNY project should tell us much as we plan and expand for the future.

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"Computer As A Tool" operates as an introductory course for all freshman at this four-year, urban state college. The one-credit course meets one hour a week as lecture and one as lab. It is taught in microcomputer labs fitted out with approximately twenty Apple IIe's and a number of printers. The course instructs students in how to do word processing, data management, and financial analysis with a spread sheet. Software employed is AppleWorks, version 2.0. An instructor-written manual and exercise book are used with the program.

History

Until 1965, Jersey City State College had been, like its five sister colleges, a teacher training institution, accepting candidates in both elementary and secondary education for training to enter the public schools. The mission was narrow enough to attract students with a level of academic competence traditionally expected of college students.

In 1965, however, the College broadened its mission to become a liberal arts institution, offering the traditional curriculum of humanities, social and physical sciences, and fine/performing arts. As such, the school began to attract students of widely differing backgrounds and skills levels. Over the next decade, as a result of this reorganization, the need emerged for a basic skills program in writing, in reading, and in mathematics. By 1975, such a program was in full operation, overseen by an Academic Foundations Committee, and operated out of the three concerned departments: Reading/Language Arts, English, and Mathematics.

The basic writing program that developed in the English Department took the shape of a course in grammar and usage skills along with a writing lab in which students were encouraged to write short paragraphs, paying careful attention to usage, punctuation, spelling, and grammar.

A perceived deterioration in standards of academic competence combined with a gradually falling enrollment prompted English Department members as well as the Dean of the School of Arts and Sciences to begin, in the early 1980's, to investigate the possibility of setting up a word-processing lab with microcomputers to foster writing activity that might otherwise be unavailable. At the suggestion of some faculty members, twenty-five Apple IIe's were installed in the Writing Lab. After experimenting with several word processing programs the faculty decided to install *AppleWorks* as its word processing program of choice. Completing the installation were several Epson printers and, eventually, two letter-quality printers.

Students from the basic freshman English course, Fundamentals of Communication, were invited to begin training in word processing. Simultaneously, a team of three faculty members from the English Department who had previously been trained in word processing began to encourage other Department members to familiarize themselves with this tool. Although a number of Department members were initially hesitant, and although some faculty raised questions about the wisdom of setting up such a lab because there was no prior departmental support and because of the health threats from a monitor, eventually these concerns diminished and most English Department members gave at least tacit support to the effort.

During this early period an effort was made to provide all freshmen with the opportunity to learn word processing. With the acquisition, in 1985, of a State Department of Higher Education grant (The Computers Across the Curriculum Grant--CAC) we decided to establish a required freshman course (Computer as a Tool) that would train freshmen in three basic computer functions: word processing, data manipulation in a database, and arithmetic calculation in a spread sheet.

In addition to this required course, the CAC program now provides a drop-in lab for students and faculty. This facility includes twenty-five Apple IIe computers as well as several IBM-compatibles, two Macintosh and two Apple IIg computers. The IIe's are designed for student use, while faculty are free to use all available equipment. The lab is open from 9 a.m. to 5 p.m. three days a week and until 9 p.m. twice a week to accommodate evening students and those whose day schedules prohibit them from using the lab. To enhance the use of the computers, CAC supports a staff of five student assistants and a lab director. There is always at least one assistant on duty to provide help with the machines and to help solve elementary writing problems. In the near future, the staff hopes to increase the number of hours the lab is open (including Saturday) and to network the IIe's to increase the efficiency of the system.

Computers as Part of the Writing System

The CAC Program is an effort to introduce basic computer functions into General Studies ("core" curriculum) coursework. The directors of the program believe that these computer tools (word processing, database, spreadsheets) should enhance learning by encouraging writing as a form of intellectual organization, and by making techniques of data organization and manipulation more readily available to the average student, and by enhancing the student's ability to work with large amounts of arithmetic data. To this end, it encourages faculty to introduce assignments into their General Studies courses that encourage writing, organization of ideas and data manipulation using the computer.

Encouraging faculty to introduce these functions into General Studies courses requires that faculty (1) become familiar with these computer tools and (2) find a forum for the discussion of techniques that encourage this introduction. The CAC program sponsors a series of three-week summer workshops for faculty with these purposes in mind. Since this program is a school-wide effort to increase writing and information processing as a form of intellectual organization, workshop participants have been selected from a variety of disciplines: in the physical sciences: biology, chemistry, physics, and geoscience; in the social sciences: sociology, psychology, political science, and economics; in the humanities: English and art; in the arts: art and music; as well as mathematics, foreign languages, and women's studies.

Although invited faculty see the primary purpose of these workshops as training in the use of the computer (we use *AppleWorks* as the training program), only about half of the forty-five hours is given over to actual computer training. Writing is best practiced by writing. Word processing is the most common computer tool used. Therefore, much workshop time is spent on this tool both in perfecting the editing techniques required by the computer program and in discussing course assignments like research reports, letters, lab reports, and memos. We believe that in the CAC Program instructors can best evaluate the kinds of assignments given to their students by doing the work themselves. To that purpose, instructors are given experience in free writing, and journal writing, as well as in converting these kinds of private writing, to reports and memos.

Each day begins and often ends with a "freewrite" in which the participant is urged to think/write about the discussions and/or activities immediately preceding the freewrite. During the first week of the workshop, collaborative writing groups are established (generally around interest areas). These groups are first asked to modify their versions of a previously written memo and combine them into a final memo representing the thinking of the group. Not only does this require the group to practice certain word-processing techniques, but it also encourages collaborative thinking/writing. Later collaborative activities include developing course assignments and gathering current information about CAI materials relevant to these courses.

The other recurrent activity of the workshops (that is, besides training in *AppleWorks* and writing) is a series of discussions about the activities just completed. Thus, after a "walk-through" introducing the concept of the spreadsheet, participants will discuss problems they encountered getting used to the spreadsheet idea. After a session of collaborative writing, participants will talk to the entire group about possible ways to use collaborative writing in their courses. An effort is made to tie together their hands-on experience with conceptualization of the techniques and problems of the activity. CAC, therefore, approaches its task on two levels: at the student level, it provides training in the use of three basic computer tools--word processing, database, and spreadsheets. At the instructor level, it not only makes the faculty member proficient in computer use, but it forces instructors to reconceive their General Studies courses so that students will use the computer as a tool for intellectual organization.

Student Involvement

CAC is now completing its third year. Since its inception, student use of the microcomputer has grown rapidly. For two years now, we have been offering the Freshman course, "Computer As A Tool," running about fifteen sections, fifteen students to a section. Thus about one thousand students have been exposed to these basic computer tools since the requirement's inception.

That this course is beginning to make a difference in writing across the curriculum is evidenced by the increased use of the word-processing drop-in facilities during the past several semesters. Drop-in student hours have increased from 842 during the fall semester to 936 during the spring semester. Having tracked student use of the lab for three semesters, we are beginning to see a bi-modal pattern (both daily and by semester). During a single day, use is greatest between 10 a.m. and 12 noon and between 7 and 9 p.m. Although use during the semester starts early and continues throughout, increased use has been found near mid-semester and just prior to final exam week. During these "peak" periods, lab facilities are strained, tempers flare, and a general miasma of discomfort reigns. Such conditions have encouraged the directors of the program to seek additional hardware and software as well as space and personnel so as to expand the lab to meet the demand. We expect this demand to increase as more and more trained freshmen become upperclassmen and require more drop-in time to meet assignments made by an increasing number of faculty who realize the potential educational value of the computer.

Perhaps more significant than merely the numbers of students using the word-processing facilities is the variety of courses in which instructors either wish their students trained on *AppleWorks* or assigned tasks that require a knowledge of one or more of the basic tools. It is now becoming commonplace for instructors to require that all writing be done on a word processor and that the spelling checker be used before work is submitted. The introductory General Studies courses in the physical and social sciences, in the humanities, and in the arts are now beginning to make use of these facilities. Courses in sociology, economics, history, geography, and psychology are some of those most commonly represented.

Computer Conferencing: a Spinoff of "Computer as a Tool"

Freshmen in the Academic Foundations program who cannot after two semesters in the writing course adequately demonstrate college writing ability are dropped from the college rolls. But through the use of computer conferencing, we are finding a way of retaining some of these students.

We have put into practice a pilot program wherein "dropped" students are invited to return to the College for one semester of "independent study." This study consists of the student using a modem-equipped computer to carry on an extended conversation with a networked faculty member. The student thereby is placed in a situation in which he/she must write in order to communicate any message, however simple. Thus the student is forced to adopt writing conventions. In addition, of course, the presence of a faculty member at the other end of the telephone line insures immediate feedback on matters of form and content.

Beyond merely "chatting" on the network, the student is asked to prepare increasingly lengthy essays written during the week with the *AppleWorks* word processor. Then, during online weekly sessions he or she transfers this writing to the instructor, who discusses the writing with the student. The student has an opportunity to revise, to ask questions or to comment on his or her writing in any way appropriate. But all this activity must be carried on in writing.

Additionally, to promote the emphasis on writing, neither the student nor the faculty member knows the other. The faculty member is known only as "Dr. Why." The student, in the very first session, is required to adopt a pen name. We think this procedure lowers the threat inherent in a teacher-student relationship and makes writing easier for the student.

At the end of the semester, the student is required to write a 300-word essay, as are all students in the Academic Foundations writing program. The essay is judged by an independent committee. If his writing measures up to college standards, the student is reinstated. If not, the student is dropped permanently from the rolls of the college.

There are several advantages and disadvantages to this system of instruction.

Advantages include:

(1) The student must depend on written communication in order to express any ideas. There are no sound cues, no inflections, no body language, etc.

(2) The student sees his own work on the screen, in print, immediately. This projects a sense of worth, validity, and importance. Chaotic structures and thin, generalized ideas look puny on the screen. The student tends to write more carefully and thoughtfully.

(3) The student receives intense, focused, one-on-one contact with the instructor for each full session, which increases his self-esteem, his sense of self-worth.

(4) The instructor can view, as it were, a developing portrait of the student's thinking, noting the hesitations, the spurts of thought, etc., being able to target more precisely breakdowns in the student's logic.

Disadvantages include:

(1) Since only part of an essay appears on the screen at a particular moment, the instructor cannot discuss the whole entity or illustrate ways in which, for instance, the third paragraph relates to the first. Even with scrolling, any immediate connection between the actual writing and commentary is limited. Not only is the student limited to written communication, so is the instructor. He cannot tell, for instance, whether the student is offended by a comment. He cannot estimate whether a student's "Yes" indicates understanding or only nervous acquiescence. He cannot evaluate the effect of his own remarks. Does "Hey! You can do better than that," come off as supportive or crushing?

(2) Problems in mechanics, spelling, sentence structure, etc. must often be neglected in order not to lose the flow of on-screen composition.

(3) The communications program is not a word processor. The instructor cannot freely demonstrate moment-to-moment, trial and error aspects of the writing/revising process.

On balance, the program in its first two semesters, seems to have advantages that are worth disadvantages. The bottom line is that a far greater percentage of students do reasonably well on the final essay and pass into the freshman course than do those who come from more conventional developmental courses.

Some Pedagogical Considerations

The CAC program is an effort to use the microcomputer as a tool to enhance the teaching of writing and thinking across the curriculum. There are several theoretical considerations that led the CAC directors to establish the program.

Firstly, computers make assigned writing in subject area courses much more attractive. Computer-produced papers are easier to read, spelled more correctly (with the help of a spelling checker), and far more easily revised. Creating multiple drafts, peer critiquing, and collaborative writing become much less cumbersome on a computer. Thus, with the computer, it becomes much more likely that subject area teachers will be willing to try these techniques. Secondly, subject area teachers seem to be more firmly committed to the program if it offers them a total package of thinking and communication techniques. It makes little sense, in a science course, to use the computer as a tool for making writing and revision easier and to ignore its capabilities for enhancing scientific investigation and thought. The most sensible approach is to see the process of thinking and communication as a whole and to use the computer imaginatively in all steps of the process. In many subject areas, this means using the database and spreadsheet capabilities of computer as well as word processing.

Thus the prewriting stage of a paper in a sociology course might very well include designing a questionnaire, administering it, and calculating means and standard deviations on a spreadsheet. In a botany course it might include compiling a database of varieties of a given species and then looking at which varieties exhibit which characteristics. These activities are part of the writing process (which means the thinking process) and are vastly enhanced by use of the computer. And just as the various stages of the writing process are not discrete--writers shift constantly back and forth from one to the other recursively--so these database and spreadsheet activities are not separable from the rest of the process of writing and thinking. Writers are likely to go back and forth, discovering new possibilities as they write and going back to the database or spreadsheet to check them out.

Seeing the thinking/writing process as a recursive continuum, a process not confined to the English class, nor one confined to actual writing, enables one to seek tools to implement this view. And, having an integrated program of word processing, database, and spreadsheet available on microcomputers enables the instructor and the students to experiment with new ways of organizing and presenting data, summarizing findings, and drawing conclusions. As usual, new tools encourage new ways of finding solutions to longstanding problems.

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UNIVERSITY OF KANSAS
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This program at a large state university provides CAI services to approximately 2,000 students enrolled in composition, composition and literature, introduction to fiction or poetry, advanced composition, and grammar and usage for composition. Faculty volunteer their students to use--outside class time--either our Writer's Workbench Lab (twelve terminals networked through UNIX to an AT&T 3B2 300) or our MacProof Lab (twenty non-networked Macintosh SE's using Microsoft Word and MacProof). Both Labs are reserved exclusively for the Department of English. We have considerably enhanced both textual analysis programs to reflect more closely our pedagogical emphasis on the process of writing and revision. We have developed student manuals that integrate software use with revision suggestions to provide further writing assistance outside the class.

CAI's History at Our School

Computer-Assisted Instruction in English at the University of Kansas has been operational since Fall 1985 following several months of careful review of various software/hardware combinations by the English Department and the College of Liberal Arts & Sciences, both of which recognized CAI as an increasingly valuable, innovative instructional tool that would possibly enhance and enrich composition instruction. They eventually selected AT&T's *Writer's Workbench* (*WWB*), a process-oriented software program that provides detailed statistical analysis of a student's writing style as well as useful suggestions for revision.

CAI receives funding from the College although the English Department oversees the program's administration and pedagogical direction. While funding is never optimal in the face of the State's fiscal restraint, CAI receives stable funding because of the College's commitment to writing across the curriculum and to intelligent applications of computers in the humanities. As we have reached larger numbers of students, the College's financial commitment has increased proportionately. In addition, the College provides complete technical support, allowing the CAI staff to spend ample time helping students use CAI effectively.

The CAI program enjoys a close relationship with the English Department and recruits solely from the Department's faculty for CAI instructors. Full-time, part-time, and graduate faculty participate. (Graduate students teach the majority of freshman composition and literature courses, and we highly value this pool of graduate teaching assistants since increasing numbers of them are computer literate and excited about the prospect of integrating computers with pedagogy.) The faculty are enthusiastic about CAI; *Writer's Workbench* provides out-of-class, objective feedback to student writers and, with considerable software enhancement by KU, supports the Department's pedagogical emphasis on developing mature student writers. Instructors volunteer their classes to participate and generally discover that *WWB* encourages students to plan essays carefully and to consider *WWB's* suggestions for revision more thoughtfully. Instructors also recognize that they can tailor CAI instruction to their own pedagogical methods. Students are equally enthusiastic for similar reasons. Despite complaints that CAI's hours are limited or that CAI cannot be accessed elsewhere on campus, students indicate on evaluation forms that writing and revising are easy and comprehensible when they use *WWB*, and they acknowledge that they benefit from many sections of *WWB's* analysis, not just its spellcheck.

CAI has grown from a pilot project that helped students in a handful of classes to its present ability to assist nearly 800 students each year, approximately 11% of the students enrolled in freshman composition and literature courses.

Since the program's inception, its two successive directors have been graduate teaching assistants in the English Department, as have its assistant directors, all of whom have classroom experience at KU. The present administrative staff consists of one director and two assistant directors. Graduate and undergraduate students work in the Lab as monitors, offering students training, technical assistance, and some basic tutorial assistance to understand *WWB's* analysis.

CAI's Relationship to a General Approach to Writing

CAI at KU allows the Department to enhance a pedagogy emphasizing process-oriented composition instruction. Classroom instruction and our software programs foster the development of student writers who recognize the strengths and weaknesses of their rhetorical strategies, the characteristics of their writing style, and the benefits of continued analysis of their process of writing. *WWB* is especially valuable since it creates no student dependency on the software program; although *WWB* offers suggestions for revision, it enhances composition instruction by placing the burden of revision in the student's hands. The ease of computer revision, coupled with *WWB's* analysis and suggestions, encourages students to see writing as an ongoing process and to value revision.

Since *WWB* does not interfere with each instructor's pedagogy, it allows instructors to select those sections of its analysis that benefit individual students at different stages of their instruction; some students may require assistance with diction, others with sentence or paragraph structure. Further, an instructor may compare a student's draft and final printouts, thereby gauging revision strategies and discussing with students the specific effects of such revisions on their writing.

Most importantly, our CAI Lab has created a noticeable community of computer writers sharing common experiences and attitudes about writing and CAI.

CAI in English provides writing assistance to nearly 2,100 students a year, approximately 28% of the University's freshmen and sophomores enrolled in introductory composition and literature courses. We offer CAI to students enrolled in such courses as Composition; Composition and Literature; Introduction to Fiction, Poetry, or Drama; Freshman Honors English; Grammar and Usage for Composition; Advanced Composition; and Technical Writing. The Department does not offer CAI for basic skills students since it has phased out courses specifically designed for these students.

At times, the University's Writing Center has recruited classes outside the College to use CAI; these classes have included courses in Astronomy and Mechanical Engineering. Although CAI offers its assistance to instructors outside the College, we limit our recruitment to about two classes annually.

CAI aims its writing assistance at freshman- and sophomore-level English courses since *Writer's Workbench*, which draws student attention to the more fundamental grammatical and syntactical elements of writing, will probably have a greater impact on those students. Besides, our version of *Writer's Workbench* does not provide varying levels of analysis appropriate to upper-level English students as well.

Our lab is not yet large enough to accommodate at one time an entire composition class, which averages twenty-two students; thus, students use CAI outside the classroom. However, CAI instructors use *WWB's* analysis in classroom writing instruction in various ways: Instructors spend time explaining the analysis; most discuss their own perceptions of *WWB's* accuracy, benefits, and shortcomings; and most composition instructors use class time for group revising sessions in which students compare experiences using CAI and discuss their understanding of *WWB's* output and its connection to their writing. Crucial to students' effective use of CAI is the human, subjective, evaluative element--in the instructor and the student's peers--which emphasizes the critical process of making mature writing decisions and encourages students to recognize benefits of revision. Thus, students initially write in the CAI Lab and receive analysis while separated from classroom instruction, but CAI instructors spend considerable time helping students make sense of their writing style and *WWB's* response to it.

Beyond this, however, what goes on in a CAI class differs little from what goes on in non-CAI classes. CAI at KU was never intended to reshape the classroom experience drastically; we use *WWB* as a writing tool, not as a pedagogical method or substitute for essential lecture and discussion. We encourage instructors to use CAI to support their own pedagogy. Too much classroom takeover by computers, we fear, will make composition instruction, already a taxing undertaking, more burdensome, and CAI should increase benefit, not effort.

Our Hardware and Software

As we said, KU's CAI draws essentially on *Writer's Workbench*, AT&T's revision-oriented software. *Writer's Workbench* is installed on an AT&T 3B2/300 terminal; through UNIX, this terminal networks twelve student terminals.

We are working to link the lab to an AT&T 3B15 in another campus building; when this 3B15 replaces our 3B2, we will access a faster system and more storage space. Only funding limits our project, but we expect that once our lab is linked to the 3B15 via multiplexers, we may begin establishing satellite labs at other campus locations.

Students receive their *Writer's Workbench* printouts on two Toshiba 321SL printers or their back-ups, two IBM proprinters. Originally having selected the IBM printers, we replaced them as our primary printers in 1987 since we found the Toshibas provide better quality dot matrix printing (even in draft mode) in less time.

Presently, KU's CAI is setting up its second revision-oriented program: *MacProof*. We recently acquired twenty Apple Macintosh SE's and this software, believing that it provides another interesting and pedagogically challenging approach to CAI. Unlike *Writer's Workbench*, which provides a batch analysis of student writing, *MacProof* allows students to select those portions of the analysis from which they, and their instructors, believe they will benefit most. Integrated with students' use of *Microsoft Word*, this software program promises to make CAI even more attractive: Students will use the increasingly popular Macintoshes available throughout campus and then finish work at the CAI Lab. In addition, *MacProof* is a desk accessory for the Macintosh, not its primary word-processing software, so students will have easy access to flexible and user-friendly software. We discovered quickly that *WWB's* word processing program is limited since *WWB* is intended for analysis, not word processing, and *Microsoft Word* will be a welcome addition. Because of Macintosh's popularity as a home computer we anticipate our choice of hardware will more closely integrate CAI with students' everyday use of word processors.

Students using the *MacProof* system receive their printouts on four Apple Imagewriter II printers. We have recently developed a computerized scheduling system that reserves lab time on either *MacProof* or *Writer's Workbench*, depending on the system to which the student has been assigned. This scheduling system is installed on the hard drive of a Zenith 150, and it accommodates nearly 1,000 students each semester. While we do not discourage drop-in users, with the computerized scheduling system students may guarantee their access to the terminal by planning ahead and reserving slots up to two weeks in advance.

The Computer Committee that developed CAI at the University decided in spring 1985 that Writer's Workbench's analysis must uphold the standards of English prose that it requires of the student, that it be easily understood by a first-year college student, and that the analysis be pedagogically sound. Our version of Writer's Workbench, while revised and enhanced by AT&T and Colorado State University, required our own considerably lengthy enhancements to reflects our criteria. We made the menu of commands more user-friendly and personal, and we modified the Draft and Final printouts in various ways: for example, we reformatted page headings to reflect a standard technical-writing format and to enhance visual appeal; added introductory paragraphs to major sections of the analysis to make each more accessible and more grammatical; rearranged the order of sections of the analysis and even deleted a few that would offer little writing assistance to students; added notes in the printout to alert students to the program's inability to read context and flag all spelling or punctuation errors; added notes to the printout alerting students to their responsibilities in using line numbers as reference points; removed computerese from explanations that appear on the printout; and enhanced spacing. The format for the analysis now prints material into standard written English and exemplifies the language we expect our composition students to use, makes suggestions more discriminatingly, and guides revision by a more careful pedagogical rationale.

We have extensively revised (nearly three times) the *Student Handbook* and *Student Terminal Manual* for the Collegiate Edition of *WWB*; and recently we produced the *University of Kansas Writer's Workbench Lab Manual*, which integrates these two publications with our own suggestions for the student's of *Writers Workbench*. Our revisions, we believe, explain the analysis further, provide better examples and suggestions for revision, and present the student materials more attractively than AT&T's resources do.

Evidence of Our Program's Effect

Almost immediately after implementing *Writer's Workbench*, we chose to research its effect on the teaching of composition and on student writing. The number of students involved in this research project represent the largest *Writer's Workbench* research undertaking to date. Results are being tabulated on comparisons of approximately 400 CAI and non-CAI students, whose writing was analyzed while they were enrolled in Composition (ENG 101) and Composition and Literature (ENG 102) at the University; we observed a large number consecutively to determine *WWB's* effect over one year of continuous CAI instruction. The research intends to compare those who receive standard class instruction in composition along with *Writer's Workbench's* analysis to those who receive the same standard class instruction without *Writer's Workbench*. Results suggest that *WWB* may allow instructors to spend less time on grammatical matters and more time teaching students to organize and develop their ideas and written expressions. If final results support these early findings, we can, with even greater confidence, look to *WWB* to help composition students make more mature revisions for their writing while concentrating less revision solely on proofreading for grammatical and spelling errors.

We evaluate the significance of CAI at the University of Kansas in light of its impact on students and instructors. Rather than commit large sums of capital to equipment acquisition, we have managed from the inception of our program to view CAI from various perspectives. We have initiated significant research of the premium collegiate CAI software, have considered all available software/hardware alternatives, have introduced CAI to manageable numbers of students and instructors, and, most importantly, have integrated *Writer's Workbench* into our already innovative freshman composition program.

The health of CAI at the University of Kansas depends on the network of pedagogical and administrative perspectives involved. The College contributes financial and technical support; the English Department contributes an innovative and enthusiastic faculty, which is creating a community of users and contributors to CAI's future.

Students using CAI outside the classroom are no longer writing in an instructionally vacuous atmosphere since *Writer's Workbench* extends the instructor's influence even to the writing process, which otherwise may occur with less guidance and feedback. Students are pleased with the opportunity to use

Writer's Workbench, possibly maximizing their attitudes about composition in general.

Our careful evaluation of our CAI software at the University of Kansas has created a program knowledgeable of its limitations yet keenly aware of its virtues. Our CAI program has involved the balanced participation of administrators, full-time and graduate student faculty, and a student body responsive to innovation. Overall, we are committed to researching, reviewing, revising, and re-evaluating CAI's effects on students in order to provide a pedagogically sound writing tool.

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KENDALL COLLEGE
EVANSTON, ILLINOIS

Kendall College is a small private four-year college where four levels of writing are offered. All English students use IBM PC's. The IBM lab is located near the main computer lab, where Macintosh and Apple II computers are also available for student use. Norton's TEXTRA word processing system has been adopted to supplement The Confident Writer textbook for freshman English students. All freshmen and transfer students are given introductory instruction in proper use of IBM computers and the TEXTRA system.

The first computers at Kendall College were purchased for the business students in the Computer Information Systems (CIS) classes. During the early 1980's the computers were used only for instruction in computer science classes so the computer lab was empty in September of 1986 because no CIS classes were scheduled for that semester. Then in October the College purchased one disk-*The Bank Street Writer* and that one disk became the link between the writing students and the computer lab. Now the computer lab is the busiest place on campus.

Bank Street Writer was chosen over other word processing systems because it was easy to use, contained a constant menu, enabled students to keep their work on their own data disks and could be used by many students simultaneously. Computers were unused and the writing program needed something to encourage and facilitate revision. With the computers the students were able to revise without rewriting the entire assignment. Sentences, paragraphs as well as words could be deleted or added with ease with a computer. Computers were also good for information gathering activities such as brainstorming and free writing.

Since 1986 every student who has taken English at Kendall has been required to learn word processing. Kendall offers five levels of writing classes: Introduction to College Writing (basic). Freshman Composition I (expository writing), Freshman Composition II (persuasion and analysis of literature), Business Writing (letters, memos, resumes, documented reports), and Advanced Writing. In addition to these five levels of writing courses, the Culinary School of Kendall College offers a Culinary Communication course with heavy emphasis on writing.

After the first term of using computers in the writing classes, the demand for computers grew, especially when the Computer Information System courses were on the schedule during the winter and spring terms. Kendall is a small school, but the five Apple II+ computers were not enough to satisfy all writing classes. Additional computers had to be added. Six Macintosh computers, nine IBM PC's and two Apple IIe's were added last year.

The College owns various software programs for each type of computer. The Freshman Year Program uses *Comprehension Power*, *The Spelling Machine*, *101 Misused Words*, *Bank Street Writer*, *TEXTRA*, *Spell Check for TEXTRA*. The *Bank Street Speller*, and *public domain software on file*. The Business Division uses *Lotus 1-2-3* and *TEXTRA*.

During the first week of classes all writing students are taken to the computer lab for an orientation with the word processing system. Each student is given the opportunity to type, edit, save, and retrieve their work. A second visit to the computer lab during the next week provides enough instruction to complete training with the system and acquaint the students with all College-owned software. All new students are given added instruction in word processing in their Freshman Seminar class. Students are given an assignment sheet explaining all computer assignments, journal keeping on computer and spelling assignments.

All work with computers beyond these two orientation sessions (and Freshman Seminar for new students) is done outside of class time. The lab is staffed each day and four evenings a week. The College has found it necessary to add space for the computer lab. The current computer lab is a suite of rooms situated in the academic building, near the classrooms. The lab is staffed by faculty and specially trained students.

In Spring 1988 the Faculty Senate voted to institute writing across the curriculum as a focus for the 1988-89 academic year. Writing is encouraged in all classes, not only the English classes: all freshman, transfer students, and business majors are now required to purchase *TEXTRA* by Norton. The Freshman Year Program at Kendall has adopted *The Confident Writer* as a textbook for the writing class and the *TEXTRA* word processing system, which contains *The Confident Writer Handbook* on disk. The Business Division requires business majors to purchase the non-text specific version of *TEXTRA*.

When Kendall started using computers in the basic writing courses two years ago, only one English faculty member knew how to use the system. Last summer all English teachers learned the new *TEXTRA* program for the College's IBM's. The English faculty attended workshops provided by the Business Division chairperson, Ed Mills, during the summer term.

Several changes in the College can be traced to the computers. The bookstore moved to larger quarters to provide disks, software, hardware, and computer paper along with the usual textbooks, notebooks, and supplies. The original computer lab became too small to accommodate the new computers; therefore, several classrooms were converted to created a suite of rooms for the new computer lab. The Academic Learning Center, where peer tutoring takes place, obtained an Apple computer for students to use for tutoring sessions.

The students are required to purchase the *TEXTRA* software instead of the usual grammar handbook. The *Confident Writer TEXTRA* disk has on it the entire grammar handbook ready to call up during the writing process. Students can check the proper way to document research papers without leaving the computer to find a book. They simply push a few keys and the appropriate pages of the handbook appear on the screen. The handbook is divided into seven sections: writing process, research, paragraphs, sentences, punctuation, confused words, and editing symbols.

Reaction to the new word processing system is favorable. Our students have diverse backgrounds; some are from inner-city schools that have little or no computer equipment or instruction, and some are from highly competitive North Shore schools that have state-of-the-art equipment. The reaction from both groups of students has been very positive: "I never really used a computer before I started school at Kendall. I never even knew anything about them, but they really do help, especially when it comes to writing papers." and, "I like to use *TEXTRA*. I used computers in high school and hated them. Since I got to Kendall I love them."

The assignments that require computer use have been increasingly creative. An example from one economics class asks the students to meet "Euclid Isosecles Acme, Vice President for Planning. He is also the Debenture Sinking Fund Trustee for the Village of West Overshoe. This small bedroom community where Mr. Acme and several other officers of the company reside, is a suburb of Acmeburg." The assignment asks the students to read a particular article which illustrates change in demand, or change in supply; state the principle of the article in precise terms; explain how or why the point is illustrated; prepare a graph to demonstrate the relationships in the article; and explain the graph.

Writing students preparing for a test must study some of the subject matter from the *TEXTRA* disk. Information gathering techniques, such as brainstorming and looping are explained on the disk, not in the textbook; so in addition to writing in the computer lab, students must study in the lab.

A college-wide theme for writing students was instituted this year: ethics and moral issues. This theme was chosen because Kendall has ties to the Methodist Church and students in business, education, social work, and other fields must make moral and ethical judgments throughout their careers. Each writing class is approaching the theme differently. The Freshman Year Program students are writing their research papers on moral issues that affect contemporary society. Each student is writing on a moral issue that interests him or her.

Plans for the future at Kendall include further use of computers for all students. Areas under consideration include using computers for make up tests and quizzes, practice exams, study notes for target classes, communication between student and instructor for independent study courses, exit essays, and placement essays.

Computers are now necessary for the writing program. Not only do computers help the writing process, they prepare our students for the "real world" where computer knowledge is vital. The computers give our new freshmen concrete, hands-on experience within the first week of classes. Computers for writing help build confidence and motivation for the students. The skills they develop on computers during their first term can be used every term until graduation.

This explanation of computers and writing at Kendall College would not be complete without a brief profile of this unique institution. Kendall's entire campus is only one city block. We are located one block from Nothwestern University. When I first arrived at Kendall three years ago, I saw the school as a microcosm. There wasn't a Psychology Department, only a psychology "person"; there wasn't a biology department, only a biology "person". The same was true of math, literature, human services and in one case the philosophy "person" was also the religion "person". During the first year at Kendall I came to know these "persons" very well and discovered that they were quite remarkable. They were mostly Ph.D's and current in their knowledge of research and trends. The stability of the school impressed me the most as I discovered that more than 50% of the full-time faculty had been teaching at Kendall for twenty or more years. The arrival of computers on campus was welcomed by the faculty and they all devoted last summer to learning how to use them. They came to an unairconditioned computer lab, on their own time, during Chicago's hottest summer to learn a new technology and better serve their students.

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LAGUARDIA COMMUNITY COLLEGE
CITY UNIVERSITY OF NEW YORK
NEW YORK, NEW YORK

The Computer writing program at LaGuardia, a two-year community college at The City University of New York, offers a range of writing courses, including two levels of Basic Skills, Freshman Composition, Writing for Business, the Research Paper, Creative Writing and several Journalism courses. The courses are usually offered in ten-week quarters, but also in "intensive" sessions of one week, called Expresses. At present we have two labs, each with twenty-eight stations. A lab technician always assists. One lab uses IBM-compatible, MS-DOS word processing programs, such as WordStar and Microsoft Word. Our newer facility uses Macintosh SE's, a Datashow overhead projector and a II NTX Apple Laser printer. We use WriteNow for most courses and appropriate layout applications, such as Quark Xpress, for Journalism.

A Developmental History of the Program

LaGuardia Community College has one of the longest running and most fully developed programs of computer-based writing courses of any two-year institution in the country. We started teaching computer writing courses on a small scale seven years ago and have expanded steadily since. Apart from certain incremental changes, like the gradual integration of non-word processing software, the computer writing program at LaGuardia falls into six stages:

Stage I: Our original (grant-supported) program of computer writing courses, directed by Daniel Lynch (then Chairperson of English) was designed specifically for learning disabled students, many of whom were having great difficulty passing their Basic Writing III course and moving on to Composition 1. Our logic was that since keyboarding has long been recognized as a "bypass strategy" for certain learning disabilities (like dyslexia), writing on a computer would combine this advantage with others: the capacity to work on typical symptoms of learning disabled writing (e.g., omitted words) one at a time and the ability to focus hyperactive students on their work. We began with two sections of Basic Writing III. Classes met for two 140-minutes periods a week (over a ten-week quarter), the first seventy minutes in a regular classroom, the remaining seventy in a computer lab, where students did all the drafts of their essays (often using materials, like peer-critiques, generated in the classroom). Classes were small, and instructors met weekly with two learning disabled specialists, to share the results of extensive testing and individual counseling of students. As students passed out of Basic

Writing III--the pass rate for learning disabled students in the computer writing course was higher than that of regular students in ordinary section--we created other computer writing courses for them. Thus, these students were normally able to complete all their required post-developmental writing courses in the computer mode.

Stage II: As we expanded the program to non-developmental courses (while still taking students in at the Basic Writing III level), the three original instructors (Marian Arkin, Brian Gallagher and Daniel Lynch) enlisted and individually trained three other interested faculty members as computer writing teachers. Also, as we taught more classes there were more "open" seats (typically three to five) after all the eligible learning disabled students had been registered. These seats we filled with "regular" students, who formed an unofficial control group--and who soon demonstrated to the Department the efficacy of computer writing courses for the general student population.

Stage III: When grant funding ran out at the end of three years, the program was modified and expanded: i.e., computer writing classes were opened to the general student population, and more of these classes were taught. During this stage the program was fully mainstreamed, although it remained relatively small-scale. Because the English Department then shared computer facilities with two other departments, we could not run more than six or seven computer writing classes a term. Thus, we had reached the limit of our growth, our potential still point. However, we were able to use the demonstrable success of students in the computer writing classes--higher pass, completion, retention and subsequent performance rates in random sampling, together with evident student enthusiasm --to convince both the Department and the College administration to support a significant expansion of the program and a significant new initiative.

Stage IV: Convincing the College administration to provide the English Department with a computer lab in 1986-87 for its own exclusive use was fairly easy in light of our achievements. However, it took more doing to persuade the administration that we needed an accompanying training program for English faculty if we were to make full use of that lab (which allowed us to more than triple the number of computer writing sections). We argued that up to this point we had been able to recruit and train *strongly interested* faculty members one at a time, but now we were looking to train ten to fifteen faculty members, whose attitudes ranged from mildly interested to skeptical to technologically insecure, at the same time. During 1986-87 and again in 1987-88, with some help from the College's general grant funds, we ran a ten-week (thirty hours.) training workshop in which the three original instructors from the program trained over two dozen English faculty in *the use of the computer to teach writing*. All participants were compensated with released time, and all attended a weekly three-hour session in the computer lab, supplemented by small group meetings and a weekly computer-related assignment. By the end of the training workshop, each participant had devised a detailed syllabus for the first computer writing course he/she was to teach. As of March 1988, nearly every full-time English faculty member, and a fair number of our adjuncts, was qualified to teach computer writing courses, and most have already done so.

Stage V: For some time we had cherished a plan for creating a week-long intensive writing course, in which students spent the whole of each day writing and discussing/revising what they had written, but we had held off until we saw that the computer made devoting eight hours a day to writing a real pedagogical possibility. The model for such a course was the kind of intensive foreign language study program wherein students are "immersed" in a foreign language all day and must communicate without recourse to their native language. Our assumption was that for most LaGuardia students written English is almost a foreign language, since they infrequently have to communicate extensively in it at work, at home or even, most unfortunately, in high school. During the March 1986 intersession, we ran our first computer-based "English Express" section, a Basic Writing III course for students entering the College in the spring quarter. We chose Basic Writing III because it is the course into which well over half our students place, via the CUNY Writing Assessment Test, and is the real beginning of the writing sequence for most students.

The success of these Express courses (we have now run over twenty sections) has been remarkable: registration rates (we turn away two students for every one we accept), attendance, pass rate, long-term retention and grades in subsequent writing courses have all been well above the College average. Besides our original version for students entering the college at the Basic Writing III level, we have created versions tailored for students entering from the ESL division and for students who have already failed Basic Writing III in the regular mode.

Stage VI: Over the next three years we will be creating a three-week computer version of Basic Writing III: to be offered in sequence, during the regular quarter, with three-week computer-based versions of developmental mathematics and reading courses. This "Supercluster" plan is intended to serve those students, the most difficult group to retain at any college, who enter the college needing developmental work in all three areas: writing, reading and mathematics. This triad of three-week courses will be linked by a thematic course ("Introduction to the Liberal Arts and Sciences") which will run for the entire term and relate to work in all three areas.

General Approach to Teaching Writing

The teaching of writing is given the highest priority at LaGuardia: teaching writing well is the most important criterion for reappointment, tenure and promotion. The English Department is strongly committed to collaborative learning, within a process-centered approach. Through handbooks, mentoring, workshop, colloquia and in-service training, Department faculty learn, share, develop and refine those methodologies which have proven most successful in conveying a strong sense of writing as process to our students (a majority of whom are both economically and educationally disadvantaged). All instructors are required to assign a good deal of writing in a variety of modes, both graded (e.g., personal narratives, formal essays, reports, research papers) and ungraded (e.g., journals, collaborative stories, free writings, peer-critiques). Writing of some sort is done in virtually every class session of every writing course. Tutoring, both in small groups and on an individual basis, is another essential part of writing instruction at LaGuardia. The composition program is heavily supported by a large Writing Center, directed by a senior faculty member (Marian Arkin) and employing one full-time and twenty-five to thirty part-time tutors. The center is open fifty-four hours a week and has six IBM-XT computers, which are compatible with the computers used in the English microlab. All students in writing courses are expected, and can be required (at the instructor's discretion), to make extensive use of the Writing Center. In some instances, grant funds have allowed us to assign a Writing Center tutor to assist the instructor in the English microlab.

Instructional Approach to Using Computers in the Teaching of Writing

From the very first, the Department has worked to integrate computer-based instruction into its overall approach to teaching, making the computer serve rather than dictate our approach to teaching writing. We have always believed that word processing--which quite demonstrably allows our students to write more easily, to edit more thoroughly and to revise more extensively--is the most valuable computer resource and should be the basis of our computer writing program. Therefore, ours is a fully integrated series of six computer writing courses in which students complete all their graded work (and much of their other writing) on the computer. Because the computer allows for more extensive, effective revision, more time is devoted to editing and revision in computer writing courses than in regular courses: in practical terms, students write fewer papers but many more drafts of those papers. Hence, revision strategies and techniques play a vital role in our computer writing pedagogy.

We also believe that a successful adaptation of proven techniques for teaching writing in a computer-based mode requires a term of practice, discussion and planning, not just a few introductory workshops--and so have required our instructors to participate in the term-long training program described above.

Courses Taught and Students Served

The computer writing program now encompasses all six major courses in the writing sequence: Basic Writing II & III, Composition 1: An Introduction to Expository Writing, Composition II: Writing Through Literature, Writing for Business and The Research Paper. Several writing electives (e.g., in journalism and creative writing) are also taught in a computer mode. In journalism and creative writing) are also taught in a computer mode. In addition, the program includes an "English Express" course and a three-week "Supercluster" version of Basic Writing III (see above). In all, LaGuardia enrolls about 1,300 students yearly in its computer writing courses--out of a student population of approximately 8,000.

Scheduling and Teaching Practices

As part of our commitment to integrate computers fully into our writing program, all computer writing courses meet each week both in a regular classroom (for one or two seventy-minute periods), as well as in the microlab for two seventy-minute periods. The classroom sessions are given over to such activities as group discussions, prewriting exercises and peer-critiques. Normally a classroom session is followed directly by a microlab session, in which students typically utilize the material they have generated in the classroom to write or revise a draft of an essay. Of necessity, most students must utilize at least one open lab hour per week to keep up with their assigned work. In addition, students may do computer-based exercise or work on revisions in the Writing Center, whose personnel have been thoroughly trained in using the computer to tutor writing.

Hardware and Software Availability

During 1982-86, the size of the computer writing program was limited by the fact that the English Department had to share a microlab with two other departments, and by the fact that this shared lab contained a XOBEX CP/M single-drive 8" disk system, which employed an early version of *WordStar*, and for which it was almost impossible to find writing CAI. In January 1987, the English Department received a microlab for its own exclusive use, thereby allowing us to triple the number of computer writing courses. This lab contains twenty-eight Zenith Z-100 microcomputers (each with a 20MB hard disk, color monitor and enhanced graphic card), seven Panasonic dot matrix printers and one Toshiba "3-in-One" near letter quality printer. Although we have considered networking the computers, we have not yet discovered an overwhelming pedagogical motive for doing so. The lab is normally operational 9 a.m. to 9 p.m., Monday to Friday, and 9-4 on Saturday. This schedule includes fourteen to sixteen hours of open lab time. A lab technician is on duty during all hours of operation.

For word processing we use *Microsoft Word*, with its spelling checker, thesarus, and outliner. Thus far, we have employed chiefly two pieces of CAI, *Writer's Helper*, particularly for the generation of essays in Composition I, and an in-house software package of exercises--developed by Brian Gallagher, Director of the Express and Supercluster programs, and Marian Arkin, Director of the Writing Center--which range from giving students practice in using the dictionary and manipulating verb tenses to developing critical thinking skills.

It should be added that LaGuardia, like a number of inner-city institutions, serves very many students who simply do not have the financial resources to purchase personal computers. Thus, our program has been constructed to allow students sufficient access to institutional computer resources to complete their extensive writing requirements (and so, to some extent, to remain on a par with those hundreds of thousands of college students who now own a personal computer).

The Program's Effect

Thus far, we have done extensive classroom assessment of two groups of students in computer writing classes. Our original group of learning disabled students proved to get significantly better grades on average than the general College population, not only in their writing courses but also in all the courses they were taking while in our program (although about nearly half of them, unfortunately, fell back to sub-average performance once they completed their computer writing courses). However, the conditions of our grant provided for a number of special services--e.g., small classes, extensive testing and counseling by learning disabled specialists, individual tutoring--which made it impossible to factor out the effect of using computers to teach writing to this group. Careful tracking of all students in the Express courses has shown not only pass rates nearly twice the Basic Writing III average, but also subsequent performance rates significantly better than average in other writing courses, whether in the regular or the computer mode. This finding, however, is also somewhat compromised by a "halo effect"--i.e., students who volunteer to come in for an extra forty-two hours of classes between quarters very probably represent a highly motivated segment of students who could be expected to perform above average in any kind of writing course.

Importance of the Project

What we have not yet measured systematically, save for a few random samplings which showed very positive results, is the performance of students in our regular term-long computer writing classes in comparison with students in regular sections of such courses. It is just for such a thoroughgoing, precise study of the results--intellectual and pedagogical--of teaching writing via the computer that we look forward to our participation in this national project.

We believe that our program could serve the project as one national model because it has already served as a local model at both two-year and four-year colleges. The program's three founders have consulted and led workshops at a variety of institutions throughout the Northeast and serve as members of several national computer writing committee. One of them (Brian Gallagher) will lead a year-long CUNY-wide seminar on "Computers in Writing Instruction" during 1989-90, a seminar in which the work of the National Project on Computers and College Writing will be a major focus.

Like many institutions, LaGuardia has already committed itself to expanding its computer writing program: in 1989-90, the English Department will open a second microlab (probably a Macintosh lab, so we will have access to the other major system for which writing software is being created). The results of the National Project, and our participation in it, should allow us to undergo such expansion with an ever clearer and more definitive understanding of the best in computer writing pedagogy.

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LASELL COLLEGE: A TWO-YEAR COLLEGE FOR WOMEN

NEWTON, MASSACHUSETTS

This program at a private two-year college for women combines two courses, Writing 1 and Computer Applications 1, for students who are likely to have difficulty with freshman composition., Students use Easy, a simplified version of WordStar, for word processing in a lab that contains twenty IBM Personal Computers and a large video display. Lasell's program emphasizes the writing process. Students develop writing skills by drafting and revising on the computer; naturally students reinforce computer skills as they use word processing software.

Background

In the fall of 1987, Lasell Junior College implemented a program to incorporate computer word processing into some sections of Writing 1, our freshman composition course. At the same time we began GATE (Grow Academically Through Education), a new program for entering freshmen whose high school records indicated a potential to do well in college, but whose records also indicated a need for a structured learning environment in order to succeed.

Students who were admitted to GATE took one less course than other students. They also received a great deal of academic support. This included study skills workshops, counseling sessions that focused on how to succeed in college, and computer writing labs that were a required component of the Writing 1 sections for GATE students.

The high school records of the GATE students indicated that many would experience difficulties with the assignments in Writing 1. The Dean of Academic Affairs and the Director of the Learning Center, who designed the GATE program, suspected that one reason for this might be that many of these students were inexperienced in the analytical skills needed in college writing. Therefore, computer writing labs were attached to GATE sections of Writing 1 in order to address the particular needs of these students.

The Director of the Academic Computing Center was very enthusiastic about the Dean of Academic Affairs and the Director of the Learning Center's plan to use the computer center as a writing lab. This administrative support was extremely helpful in constructing the writing portion of the program. However, none of these administrators had much experience with the teaching of writing.

Therefore, they envisioned working on what they considered basic skills, i.e. grammar, to be an important part of the writing lab.

They also thought, however, that the lab would encourage the process approach to writing instruction, and so asked an instructor who was committed to teaching writing as a process to take one section of GATE English, and hired a new instructor with similar views to teach the other two sections. Neither instructor had experience using computers in the teaching of writing, and neither was convinced that computers would necessarily be helpful. However, both thought it was possible computer writing labs would enhance the process approach to teaching writing. Their experience in the writing lab confirmed this hypothesis.
The instructors of the GATE sections of Writing 1 made every effort to present the computer writing labs as an extra opportunity for students to improve skills rather than as a punitive or remedial measure. The students seemed to accept this opportunity willingly, partly because their first-semester enthusiasm made them view almost anything positively and partly because of the lure of the computer lab itself. Furthermore, many of them were fully aware that they had had difficulties with past English classes and were happy to try anything that might help. Students were assured that they would not have additional homework because of the writing lab, but they would have time to work on writing class assignments during the lab.

Computer Writing and a Process Approach

Based on their experience teaching freshman writing courses, the instructors agreed that using a process approach helps most students to think about what they want to say and to develop their ideas. Frequently, inexperienced writers believe they have completed an assignment as soon as they have filled the required number of pages. The idea that the act of writing can help us think is frequently foreign to students. It seemed likely that introducing GATE students to this idea would be particularly helpful to them as they developed as writers and thinkers.

Therefore, the instructors emphasized planning, drafting, and revising in both classes and labs. In order to do this, they decided to use a system of required drafts. For each of the five essays of the semester, students wrote two rough drafts before turning in the third draft for a grade.

Since word processing makes revising so much easier, the instructors hoped the drafts would work as an incentive for students to view word processing as helpful and so want to learn it. Furthermore, after receiving a grade on the third draft, students were encouraged to revise their essays another time in order to try for a higher grade.

To accommodate the program's designers, the instructors also agreed to use some of the lab time for computer-assisted grammar exercises. However, both teachers involved prefer to teach grammar on an individualized basis, using a student's own writing as the text. This attitude may have influenced the outcome--neither instructor found that the students learned much grammar from computer exercises. The students preferred to use computer time to work on drafts of their papers. Again, the instructors' enthusiasm for this activity may have been an influence. Both the Dean and the Director of the Learning Center were willing to modify their views on the use of lab time, and the grammar exercises were phased out.

Student Enrollment and Courses Involved

The Writing Lab was associated with two required courses: Writing 1 and Computer Applications 1. Writing 1 is a typical three-credit freshman composition course, and Computer Applications 1 is a one-credit course in word processing. Writing 1 meets for three hours a week, and Computer Applications meets for one hour a week for a fifteen-week semester. Students in the GATE English sections met for an additional two hours a week in the computer lab. The GATE program began in the fall of 1987 with twenty-five students. Since a number of students who are admitted into the traditional College program usually have trouble with Writing 1, students from the general population of the College were also included in the GATE Writing sections. This inclusion was based on students' scores on an in-house designed writing sample and the English section of the Stanford Test of Academic Skills.

Members of the English Faculty holistically scored the writing samples on a scale with a low of 1 and a high of 4. Students who received a 1 on the Writing Sample and students who were below the thirty-second percentile on the TASK were placed in GATE sections. The thirty-second percentile was used as the cutoff on the TASK because during the previous two years, there was a .87 correlation between students who received a D- or F in Writing 1 and those who scored below the thirty-second percentile on the TASK. Above the thirty-second percentile the correlation was not as significant. If students received a 2 on the Writing Sample, their TASK scores in English and Reading and their high school records were examined. Placement of these students in the GATE sections was determined on an individual basis.

Based on their test scores, twenty-two students were added to the group of twenty-five GATE students. These forty-seven students were placed into three GATE English sections.

Instructional Component

Since both instructors used a process approach to writing, invention and drafting were addressed in class during the few first weeks of the course. Discussion of related reading, student papers, explanation of types of assignments, and peer editing were some of the activities that took place during the semester. Instructors also consulted with students about their drafts either during class time or during individually scheduled appointments.

Meanwhile during the first three weeks of the semester, the Director of the Academic Computing Center taught the students word processing skills in the lab. The English instructors also attended these sessions. Students learned the same word processing program that was used in all sections of Computer Applications. However, since the GATE sections met in the lab three times a week, they learned word processing much more quickly than the other students, who attended Computer Applications just once a week. In a short time, students knew enough to draft their essays on the computer.

After the introductory weeks of learning word processing, students spent most of the lab time working on drafts of papers. The writing instructors attended the labs in order to consult with students as they actually worked on drafts. Initially, part of the lab time was used to work on grammar, but as mentioned above, this was gradually phased out as it became clear that both students and instructors felt working on drafts of papers was a much more helpful use of lab time.

During the first weeks of the semester, many students experienced a number of frustrations. Naturally drafts were lost and paragraphs deleted rather than inserted. Also with their background of academic difficulties, many of these students, not surprisingly, had initial difficulty attending to the many procedures involved in learning word processing.

Once students felt more comfortable with machines, however, they were extremely enthusiastic about word processing. They quickly realized the advantages of revising on the computers. In addition to the required number of drafts, some students revised essays five or six times. One notable essay went through eleven stages. The students were also very enthusiastic about consulting with each other about making changes in their papers. Often during the lab, they frequently and spontaneously used peer editing techniques they'd learned in class. In fact, there was much more interaction among students in the lab than the instructors had anticipated.

The students in these sections used the computer lab more than any other students in the school. Besides their scheduled three hours a week, students averaged four additional hours a week on the computer.

Hardware and Software

Lasell's Computer Center consists of a small lab containing fourteen IBM Personal Computers and a large lab containing twenty IBM Personal Computers. The writing labs were held in the large lab so that each student used her own computer.

Although the lab contains a number of different word processing programs, students learn *Easy* in Computer Applications 1. *Easy* is a menu driven, simplified version of *WordStar* that is actually easy to learn. It contains most of the essential features for revising papers: insert text, delete text, move text. Many of the commands are the same as *WordStar* commands, so if students want to use a more powerful program, *WordStar* is easier to learn after using *Easy*. Furthermore, files in *Easy* may be called up in *WordStar* (and vice versa), which is helpful for students who choose to learn that program.

Assessment

By the end of the semester, both writing instructors were very enthusiastic about using computers in order to enhance teaching writing as a process. The students' performance supported their enthusiasm.

Most students in the GATE sections successfully completed both Writing 1 and Computer Applications 1. The grade distribution of the forty-two students who completed Writing 1 follows:

Grade	B+	B	B-	C+	C	C-	D+	D	D-	F
Student Number	4	4	4	10	8	5	3	2	1	1

During the previous two years there was a .87 correlation between students who received a D- or F in Writing 1 and those who scored at or below the thirty-second percentile on the English section of the Stanford Test of Academic Skills. However, none of the nineteen GATE students who scored at or below the thirty-second percentile received a D- or F. Their grades follow:

Grade	B+	B	B-	C+	C	C-	D+
Student Number	1	3	1	7	4	2	1

Many students in the GATE sections, then, received higher grades in Writing 1 than might have been expected based on the grades of students with similar TASK scores in previous years.

In addition, during the course of the semester, the students appeared to improve their revising skills. Working together in the lab encouraged them to become thoughtful, critical readers, able to make constructive suggestions about the work of peers. They also became far more comfortable using technology.

Students in the GATE sections tended to have more difficulty in Computer Applications 1 than other students. Their rate of A's (students receive A, pass, or fail in this course) was lower than the rate for all students. However, when the number of students who received an A is combined with the number who received a Pass, the percentage of GATE students who successfully completed the course is similar to the percentage of all students.

	A	Pass	Fail	Incomplete
GATE	38.0%	57.1%	2.4%	2.4%
All	56.8%	36.0%	4.9%	2.2%

The Director of the Academic Computing Center was very impressed by the GATE students' use of the writing lab hours and the number of additional hours they spent in the Computer Center. Therefore, she revamped the way Computer Applications is taught; in the 1988-9 school year all students learned to use word processing as a tool for revision.

Implications

Lasell's experience with the GATE program suggests that using computers can promote the process approach to writing. Students are far more willing to revise essays when they don't need to spend time mechanically copying.

Incorporating writing labs into sections of Writing 1, where it was anticipated students would have difficulties, worked well. The students responded positively to having a scheduled time when they could work on drafts. They could consult with instructors as questions arose. This was particularly helpful for the students involved in GATE, moving them away from patterns of frustration and demoralization.

The writing lab was also useful for students who are in the habit of procrastinating. Scheduled lab times helped them to keep up with assignments instead of delaying writing until the night before the final draft was due.

Furthermore, many enjoyed the camaraderie of writing in the same room where others were working on the same assignment. This gave students an opportunity to consult with each other easily and freely.

A number of the students in the GATE sections made remarkable progress. In some of these cases, the students had so little experience with writing in high school, and none in how to tackle writing, that once they were exposed to the concepts of prewriting and revising, they took off. The writing lab gave these students an opportunity to fully explore the writing process.

Although the comments above focus on students who come to us with difficulties in writing, incorporating a writing lab is not only useful for students needing extra help. A computer writing lab allows any student access to the advantages of word processing for revision, scheduled time to work on drafts with an instructor available, and the camaraderie of working in proximity with other students. These enhance the teaching of writing as a process for all students.

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The Educational Online System (EOS) at MIT supports a range of writing subjects, from basic expository writing to advanced essay and technical writing classes, as well as other non-writing subjects across the curriculum. Writing classes in EOS are held in an electronic classroom outfitted with twenty DEC VS 2000 workstations running specially designed software for the creation, exchange, display, and annotation of texts. In addition, EOS provides electronic textbook facilities for storing and exchanging online curricular material. Large-screen projection of real-time in-class writing and peer review is also supported by EOS. A special feature of EOS is the campus-wide Athena network of approximately 1,000 DEC workstations and IBM RT's, from which any student can access EOS software at anytime from anywhere on campus.

Purpose

The *Educational Online System (EOS)* at MIT uses the campus-wide Athena network and specially designed software running on DEC VS 2000 workstations and IBM RT's to support conventional classroom practices in writing and other subjects across the curriculum. Courses using *EOS* are conducted in an "electronic classroom" outfitted with a Hughes light valve projector for large-screen display of individual workstation screens. *EOS*, therefore, permits real-time, in-class use of computer technology and allows students and instructors access to personal directories and other specifically tailored instructional material online. All online material (student assignment files, notes, curricular files, and electronic textbooks) may be accessed in class for revision, display, or exchange. In addition, new files may be created in class for immediate exchange, display, and manipulation; these newly created files may be sent to a central bin to be picked up, edited and revised in class by any member of the course. All such material is also retrievable for revision, display, or exchange at anytime outside of class by anyone registered for that particular course. Thus, all assignments, and all curricular material, are composed online, turned in or exchanged electronically, annotated online, and returned to the student over the network.

EOS was designed primarily for writing courses although in practice this system has proven to be subject neutral. At least ten subject areas outside of writing have employed our software. However, the capabilities described above make it ideal for writing courses where in-class workshops and the compose-review-revise cycle are especially critical. *EOS* dictates no necessary pedagogical methodology and may be tailored to the specific uses of a particular instructor, course, or student clientele. *EOS* does not "teach writing," nor does it offer a "program" for the writing process. Rather, it supports and enhances the conventional student-teacher and student-to-student interaction in and out of class. As such, it fundamentally transforms the dynamic of that relationship and alters the psychology of in-class writing and instruction.

History of the *EOS* Project

Interest in using computers to support educational practices has a long history at MIT. With the funding of Project Athena five years ago, discussion within the Writing Program for specific educational initiatives in writing on computers began in earnest. To facilitate these discussions an informal Committee on Writing Instruction and Computers was created.

At first, committee discussions involved faculty members from Humanities, Mechanical Engineering, the Artificial Intelligence Laboratory, and Project Athena. However, the proposals that came out of these discussions were either too large in scope (with reference to experimental expert systems to diagnose prose structures) or too narrowly specific (computer-assisted drill exercises on grammar and usage, for example).

In addition, Committee members reviewed various software packages for teaching writing. While all products offered some valuable piece of the overall picture in writing instruction, many writing faculty felt straightjacketed by the programmed instruction implied in each package. Also, writing faculty were distrustful of the "computer lab" syndrome in which computer use was presented as an add-on to the traditional classroom dynamic. Furthermore, writing faculty at MIT felt uneasy in the position of appearing to accept whatever the programmer dictated to them. Our discussions often revealed conflicts between programmers who were more interested in adding "features" to a particular computer application, even when these features were of dubious pedagogical value.

It was only after four members of the writing faculty wrote out what they actually did in and out of class that a workable project began to take shape. From these documents we isolated four specific processes that defined writing classes: the creation of texts, the exchange of these texts between student and instructor and student and student, the review or annotation of text by instructors and peers, and finally the display of texts in class for discussion and revision.

From this analysis we saw clearly that we had defined a new model for using the computer in a writing class. Our previous dissatisfaction with educational software stemmed from the designer's attempt to model certain cognitive processes that were supposedly going on in a writer's mind during composition. Many of these products relied on the work of theorists such as Flower and Hayes to define and support the "process" of writing and revision. However, we were doubtful that the computer could model anything as uniquely human as the mind in composition. In fact, we came to believe that many educational software products in fact substituted a reinforcement, or Skinnerian, model for the cognitive process one they purported to teach. The student simply internalized the prompting of the program; in effect, the student was being programmed too.

In contrast, our isolation of the four processes that, we felt, defined any writing classroom led us to a different model for computer support of writing instruction. Instead of using the computer to model anything as subtle as a "mind," we decided to model the classroom itself as a "mechanism." In doing this, we were using the computer to model another machine. For our purposes, then, we conceived of a classroom and its associated dynamic of activities as a set of "mechanical" processes, and we sought to determine how the computer could support these traditional activities in real-time and whether that support would change the dynamic of instruction. Also, as writing instructors became committed to teaching writing as a process, we wanted to see how network technology could support writing instruction; would it provide the interactive functionality that researchers of computers and writing were looking for?

The most immediate effect of adopting this new design was that a project which had been stalled for over two years was quickly developed and implemented, with complete documentation, within six months. We created software to support each of the interrelated processes we had identified. This software permitted orderly classification and storage of personal files and general curricular files throughout a semester: it provided for easy exchange of tests in and out of class; it offered two online annotation systems; and finally, it permitted in-class display of texts for discussion and real-time revision.

The General Approach to Writing with *EOS*

The *Educational Online System* supports a range of instructional strategies. Most obviously, *EOS* enhances collaborative learning since it provides for easy exchange of texts in and out of class between students and peers and between students and instructors. Programs for storing and exchanging files in central repositories, or bins, coupled with online annotation programs, support fluent communication over the network. Students are, therefore, encouraged to read and comment on each other's work.

In fact, as instructors we have discovered that online annotation of assignments changes the power structure of the traditional classroom. In a sense, online commentary encourages a collaborative stance between student and instructor: the instructor is forced to make coherent, prose comments on a text in place of the usual bold, although sometimes mute, symbology employed in correcting hardcopy. Thus, the instructor gets implicated in the content of a text: he or she cannot hide behind comments on grammar and syntax alone, even though these kinds of comments remain important. The ease with which students may transfer texts among themselves also permits a "shadow" classroom to come into being next to the "real" one. This "other" online class communication, out of the reach of the instructor, is both the apotheosis of passing notes around, as well as the beginning of a truly self-educating, or at least self-authenticating peer community. It permits language to become the context in which other activities take place and achieve meaning. In this sense, we claim certain alliances with Bruffee and Vygotsky in the conceptualization of our project.

Furthermore, this collaborative element within *EOS* supports a process emphasis in writing instruction. As more and more texts are created, they are easily archivable and retrievable; trajectories of thought throughout a semester are more easily discernible than before. A geology of composition is attained. Yet, the real-time manipulation of texts in class also permits us to get closer to the moment of composition, to the act of it. Thus, *EOS* extends instruction over time while also offering a means to collapse time to get at the germ of an idea in a text as it is being formed.

With these capabilities it is now easier to chart the migration of a text into different forms over time, too. Thus, a proposal for a text becomes an abstract or an introduction, then a type of essay, which can be further transformed into another type. Students quickly acclimate themselves to style variations and to different rhetorical strategies in composition. And since the online storage capabilities of our system are so robust, each student can maintain a portfolio of work over a semester. These portfolios are critically important at mid-semester conferences.

Finally, *EOS* fundamentally transforms the psychology of in-class discussion. We can ask students to write for twenty minutes, store their essay, turn it in online, and immediately display it in class for discussion and perhaps another round of revision and display. Students now see the point of an exercise immediately, rather than having to wait a week for more engagement with the process of writing in class.

Number of Students and Kinds of Courses Using *EOS* at MIT

At present, ten different courses across the curriculum employ *EOS*, from writing courses to various engineering courses. Within the Writing Program itself, *EOS* is used in two sections of a senior-level technical writing course, an upper-level course on the essay, and two freshman-level expository writing courses. The number of students, therefore, taking courses in the Writing Program using *EOS* is approximately 150. The number of students using *EOS* in non-writing subjects is approximately 200-300 more. In addition, in Fall 1988 *EOS* was used to support the undergraduate writing cooperative at MIT. This program is a joint venture between the Writing Program and various technical content courses in which writing faculty make presentations on style and format in report writing; papers are then graded for content and style of writing. The total number of students with access to the system within the cooperative was 600. Thus, the total number of students affected by *EOS* at MIT during the Fall 1988 semester was over 1,000 (approximately one-fourth of the undergraduate class).

Activities within the Electronic Classroom Using *EOS*

Computers support and enhance conventional classroom practices in real-time; all activities take place in one dedicated teaching space. To demonstrate the dynamic of interlocking systems available to us in the electronic classroom we will describe a typical two-hour writing class.

As with any conventional class, the first five minutes are a period of settling in: students log on to their workstations and attach their home directories and the "course locker" containing the suite of programs within *EOS*. Students do not use floppies because the network file system at MIT gives all undergraduates sufficient disk space on the system to store work for all courses for the tenure of their undergraduate study.

Next, the instructor makes a brief twenty minute presentation on some topic related to that day's work. To illustrate this presentation, anywhere from one to as many as five sample texts from the online curricular files are displayed in class on the light valve: students also call up these texts on their own screens to make notes or to follow along. The instructor can manipulate these curricular files also, and frequently will to make some point on style or structure more apparent. At the end of this presentation students can save their marked up versions of the texts on their home directories; unmarked copies still reside in the general handout file.

The presentation is followed by a short (twenty minute) in-class writing exercise. Students may be asked to pick up another text from the handout bin; usually this text presents some question for further analysis. The class calls up another window for creating a new file--in this case a brief essay in response to the topic (*EOS* runs under the X window system, which allows for multiple windowing and parallel processing). Usually, while students compose their essays, the instructor walks around the room to observe compositional strategies or to confer with individual students who may be temporarily stumped.

As follow-up, the class is then asked to save their files and turn them in to the instructor. The instructor may then review as many sample texts as time allows. These student texts are displayed on the large screen, discussed, and possibly edited in class. Modifications could be displayed immediately. This cycle of in-class writing, turning in, picking up, and reviewing takes approximately forty minutes.

The instructor then typically displays a brief paragraph that contains several structural problems. The class is asked to revise this brief passage at their workstations for a few minutes. Two students are asked to volunteer their revision for in-class display in order to stimulate further discussion of paragraph development and coherence.

The remainder of the class is usually devoted to a workshop on the previous week's out-of-class writing assignment. The instructor, who has already annotated these texts online, can call up clean copies from the turn in bin for display on the light valve. Students, who may have already commented on drafts of this assignment in their peer groups, discuss the text and may offer certain revisions, which are displayed in class.

As is clear form this brief description, the cycle of lecture, exercise, review, and feedback is much more immediate than in a conventional class. More material can be displayed in class and more examples of student work discussed. Not only is it possible for students to practice what they have been discussing--now they can go through that cycle numerous times during one class meeting.

Description of Hardware and Software in *EOS*

Project Athena offers a fully distributed, campus-wide network of approximately 1000 DEC VS 2000 workstations and IBM RT's running on a UNIX operating system with Emacs as the text editor. The X Window Toolkit permits multiple windowing functionality with many programs operating at once at any given workstation. The Network File System permits every MIT undergraduate to store all course work online in his or her own home directory. Only the student has access to these files.

EOS consists of a suite of programs that allow texts to be created, stored and classified, exchanged electronically, annotated online, and returned to the student for display, and further revision, both in- and out-of-class. The "turn in" program permits a student to turn in assignments to the instructor, who may then annotate them online with the "grade" program. The "grade" program inserts an instructor's comments directly into the text; these comments are demarcated from the original by means of symbols and indented margins. These comments may also be dumped to the end of any file, and they may also be collected in a separate file for printout. The "grade" program also provides instructors with a supple means for storing all class grades and comments on individual students--in effect, it crates a complete student portfolio of work over the course of a semester. Instructors store curricular files online by means of the "handout" programs, which also allow them to characterize these files by means of a note-taking function within "handout." Curricular files are typically organized by week number and may be added to or deleted at any time by the instructor. Handouts are accessible to students by means of the "take" program. These programs are written in C; the annotator is written in a Lisp language in Emacs.

Of course, students and instructors may also communicate by means of electronic mail and "Z Write," a real-time screen-to-screen communication. "Z Write" is not part of *EOS* itself, and is rarely used. The Hughes light valve permits large screen projection of texts in class.

Finally, a "reply" program allows an instructor to play back any composing session, character by character both in- and out-of-class. This program is especially useful for displaying individual composing and revision strategies. A multi-user text editing capability is currently under development.

The Effect of *EOS* on Students and Faculty

By all accounts the first two years of implementation of *EOS* have been successful. Students especially like the immediacy of in-class feedback available through this system. The cycle of lecture-exercising-display-review is, as one student remarked, "more like the way we think." Students also gave high marks to the new dynamic of in-class work: they could actually write in a writing class, rather than having to listen passively. Instructors also felt this change: in-class work seems more related to the act of writing.

Both students and instructors, however, feel that online annotation is a more complicated transaction. Students actually seem to prefer the traditional red marks bleeding over hardcopy to the cooler surface of online marginalia. Of course, that is the key: the instructors comments are now elevated from the realm of the margin; they are part of the developing text, an aspect of the context of language use, not merely a crude calibration of an effect on an ideal audience. Students probably are less enchanted with online comments since these comments must be more carefully read and understood to be effective; instructors, too, must become familiar with this change in their status as audience; they are becoming co-authors in a sense, at least collaborators.

Most importantly, we feel that our decision to model the classroom as a mechanism was a valid and productive design choice. It permitted us to implement a workable system that is stable and infinitely extensible; *EOS* is limited only by the imagination of its users; it does not dictate any particular method for teaching subject matter. The most striking evidence of this vindication is the acceptance of *EOS* across the curriculum at MIT.

The Pedagogical Importance of *EOS*

In addition to its usefulness as a tool for supporting conventional classroom practices and as a means for transforming the psychology of classroom interaction, EOS is itself a means for assessing the usefulness of other educational software packages. Almost any piece of educational courseware may be ported into this system and its effectiveness judged in classroom applications. EOS in effect offers an electronic trellis on to which any other product may be grafted to be used at anytime. As such EOS is itself inherently "innocent": it carries with it no necessary methodological implications.

In *Mindstorms** Seymour Papert argues against what he calls the "balkanization of teaching with computers"--the use of a computer technology in a way that atomizes true education into separate prescriptions for a pre-programmed method of performing a particular operation, whether writing or doing physics. He complains about educators who fall into the fallacy of using the computer to program the student rather than teaching the student to manipulate the computer in order to understand a concept or idea more richly--to facilitate thinking about thinking. Papert argues that we should use computer technology to create an "intellectual environment in which the emphasis is on process" in order to "give people with different skills something to talk about." With this sort of syntonic learning the computer becomes an "object to think with" rather than a mere trope of a thinking object.

It was our intention to use advanced computer network technology to create this kind of richly interactive environment, or theater, of ideas to stimulate thinking about and through writing. We feel strongly that our prototype online classroom offers a supple medium of integration for any number of individual educational software products available today. More importantly, *EOS* expands the functions of an instructor without entailing a necessary accompanying pedagogy. It supports the most conventional, and long-used, teaching practices involving the creation, exchange, display, and review of texts in a writing class, and it offers robust possibilities for campus-wide, across the curriculum interaction.

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* Papert, Seymour. *Mindstorms: Children, Computers, and Powerful Ideas*. New York: Basic Books, 1980.

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A New Jersey community college uses word processing in basic writing and freshman English courses in two locations: twenty-four stations for basic writing and thirty stations for freshman composition. Dumb terminals are connected via fiber optic lines to a VAX 11780 minicomputer. The software is *Word-II* *by Data Processing Design for word processing and a locally developed set of drill and practice exercises for basic skills.*

Mercer County Community College (MCCC), situated on a 292-acre campus between Trenton and Princeton, New Jersey, enrolls approximately 2,200 full-time students and approximately 6,000 part-time students in both the fall and spring semesters. As in the other New Jersey community colleges, approximately 40% of MCCC's incoming freshmen are assigned to developmental writing classes based on their New Jersey Basic Skill Placement Test scores.

For the last several years, faculty members in the English Department and the Academic Skills Division have been using word processors in the teaching of writing. This, in itself, is not news, but at Mercer the use of a minicomputer rather than microcomputers and floppy disks has added a couple of interesting dimensions. MCCC opted to go the minicomputer route because 1) the system was already in place for secretarial science courses, and 2) no floppy disks with their inherent problems would be involved.

We began using the College's Digital Equipment Corporation (DEC) VAX 11/780 minicomputer to teach basic writing classes in the spring of 1985. Word processing had been used in writing courses at MCCC since the spring of 1984 when a journalism class began using the system. Since the journalism class had reacted so favorably to the word processor, a proposal was submitted to the MCCC administration to devote a classroom in the liberal arts building for the sole use of word processing writing classes. By the spring of 1986, the computers were in place for the College's freshman English and journalism classes. The basic writing classes continued to use equipment in a secretarial science classroom until the fall of 1986, when they moved in and shared the liberal arts classroom.

The software used in the word processing classes is Data Processing Design Corporation's *Word-II*, a relatively sophisticated business-oriented package. Only about 20% of the capability of *Word-II* is used by the writing classes. The freshman composition and basic writing students use the system to create, edit, and print a document.

When word processing was first used in basic skills classes on an experimental basis, a number of questions needed answering: Would the basic skills students be able to handle the mechanics of the system without being bogged down by the process? Also, would they use the system for its hoped-for purpose--to increase revision, editing and proofreading? Although some students did have trouble with the system (and some even withdrew or changed sections because of it), most students, once initiated, learned not only how to use the system, but how to use it to accomplish the course goals of creating, revising, editing, and proofreading.

At the beginning of each semester, all students are given account numbers and passwords for their individual computer accounts. Each student is given 500 "blocks" of space; a typical essay will take up 6 to 8 blocks. Thus, the students have more than enough space to do a semester's work.

Both the freshman composition and basic skills students--currently 300 and 80, respectively--routinely master what is needed of the system in two to three fifty-minute sessions. They learn all the essential commands, (roughly 15 to 20) relatively quickly, even though most of them have little or no prior experience with computers. In the freshman composition classes, the students develop the ability to write an essay of approximately 300-500 words in a 50-minute session. In the basic skills writing classes, the students write a 200-300-word essay in an hour.

The basic skills writing class format is structured so that the students attend a one-hour lecture and a one-hour writing session in the word processing room and a two-hour writing lab per week in the Writing Center, a specialized facility where students can work at their own pace on assigned exercises. During the two-hour lab, the students work together or independently on grammar, punctuation, and mechanics exercises. In the lecture class, the instructor covers paragraph structure, coherence, unity, and development of specific detail. In the writing session the students compose on assigned topics, creating, adding, deleting, and moving text until they are pleased with the content and organization. They then move through their essays, correcting spelling, punctuation, and mechanical errors. When they feel they have produced their best work, they print the essay and proofread it again for content and structure improvement. Depending on time constraints, they either make corrections on the screen and reprint the document, or they make corrections directly on their hard copy.

All students in the basic skills writing classes are assessed at the beginning of the course through holistically scored essays and sentence skills tests to determine correct placement, to identify strengths and weaknesses, and to help calculate the extent of the students' improvement through the semester as demonstrated on the post-test. At the end of the semester, they are tested on their sentence and essay skills through an exit examination, which determines whether they will repeat the course or go on to the College's freshman composition course. The freshman composition students must also pass a holistically scored essay in the final week of the course to advance to the second level of freshman English.

From the inception of the use of the word processor in the writing classes, certain faculty members expressed much skepticism and even downright hostility toward the use of a computer in teaching writing. Some writing faculty described the word processor as just another step in the dehumanization of education or just another expensive toy. However, those faculty members who used the word processor were convinced of two immediate benefits: 1) they could now read student's essays; 2) students using word processing tend to have a high degree of pride in the neat and readable appearance of the product.

A recent study done in cooperation with the Princeton University Department of Psychology supported the position that the faculty using word processing have regarding benefits of computer-aided writing. The survey was given in the third week of the semester and again in the fourteenth week; the writing sample was done in the fourteenth week. In a comparison between classes that used word processing and classes that did not, word processing classes showed a significantly higher level of improvement in their writing skills based upon a double-blind holistically scored essay. The study also showed that students who used the computer in the writing classes demonstrated an interest in taking other computer-related courses. In addition, both male and female students indicated that they liked writing more than they did at the beginning of the semester.

One of the limitations of the VAX system has always been the lack of computer-aided instruction exercises to supplement the writing instruction. In the summer of 1987, we obtained an internal grant to create CAI for the VAX. Working in conjunction with the systems manager and a data processing instructor, we created new exercises and adapted existing writing center exercises to the system. Now with five keystrokes, students can move an entire page of exercises into their accounts. They can then manipulate the text just as they can with text that they have created; they can edit, make corrections in the exercises, print them out and hand them in for evaluation.

Overall, those faculty members who have used word processing have found it to be an excellent tool in the teaching of writing to basic skills students. In addition, anecdotal evidence from the students as well as the recent survey conducted by Princeton University indicates a high degree of student satisfaction with the experience of learning writing on a word processor.

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This project at a small comprehensive, private university offers instruction in writing and other basic skills in a twenty-five station networked Macintosh classroom equipped with file serving and video projection capabilities. The project uses MacWrite for word processing along with locally developed courseware. Freshman composition classes taught in the facility emphasize computer-based prewriting activities and strategies for utilizing interactive peer review in the writing process.

Introduction

In the last twenty years, major changes have occurred both in computer technology and in the teaching of writing. Although the changes make these two areas highly compatible, the writing profession has only begun to see how computers can advance the process approach to writing. We at Mercer University have established an Interactive Writing Classroom (WIC) in which teachers and students can take advantage of word processing, file handling, text analysis, text display, and networking capabilities of computers during class time, not just in a supplemental after-hours laboratory. Our classroom consists of an *AppleTalk* network of twenty-five Macintosh workstations. Software used on the system includes the *MacWrite* word processor, the *AppleShare* file server, and a variety of commercial and locally developed packages, templates, and lessons. Mercer's program was made possible through funding by a Department of Education Title III grant for the five year period from 1982 through 1987. The IWC has been in place for two years, and it enjoys an ongoing commitment from faculty and administrators to support its mission.

The Interactive Writing Classroom

Several criteria were taken into consideration when a networked environment for teaching writing was first discussed at Mercer. The network, we believed, must provide a high level of interaction in order to allow writers to compose and receive feedback. It is important to us that the system allow the instructor to "talk" to each (or all) student stations as well as allow students to talk to the instructor and to each (or every) other student. Writers had to be able to access word processing and text analysis programs, send and receive messages, and print. At the same time, the system had to be simple enough to learn and to use so that we could train approximately a hundred new users every nine to ten weeks of the year. The necessary balance between power and ease of use resulted in our choosing to base the IWC on the Apple Macintosh microcomputer and Apple computer's *AppleTalk* network.

Title III grant funding allowed for a network of twenty-three student stations, one instructor station, a dedicated file server, and three dot matrix printers. The first classes were taught in the facility in the beginning of January 1987. Since that date, nineteen classes with a total enrollment of approximately four hundred students have been offered in the IWC. Apple's *MacWrite* word processor and *AppleShare* file serving software are used in all classes. Individual instructors have the option to require the use of additional software for outlining, text analysis, spelling and grammar checking, simulations, etc.

The IWC is used in two ways: primarily as a specialized classroom where the teaching of writing is enhanced through the power of computer, and secondarily, as an open writing lab during non-class hours. During class time, the network allows students to compose and share text with their instructor and with peer review groups, who examine papers and make comments and suggestions. Additionally, individual instructors set up exercises or lessons on the system for some or all students in the class to work on. The classroom is open fifty to fifty-five non-class hours per week for out-of-class writing, homework assignments, and other specialized functions. The classroom is designed to provide the flexibility to allow instruction in writing courses of all kinds, ranging from freshman composition to advanced composition, to newswriting, to business or technical writing. Approximately six to nine sections of freshman composition are taught in the IWC each year.

The goal of the Interactive Writing Classroom Project is to improve the writing ability of our college community. Being able to think well and to express those thoughts effectively are important needs both in higher education and in society as a whole. The IWC provides an environment that allows us to utilize the latest tools and technology to help us to teach writing more effectively.

Since 1981, writing has received increased attention on our campus: freshmen have been placed in composition classes based on our locally developed writing assessment system; fifty-nine faculty members (approximately 38% of full-time undergraduate teaching faculty) have participated in intensive, two-week summer writing workshops; and several upper-division courses (in departments including sociology, psychology, and speech and dramatic arts) have been revised to make writing a significant part of the course content.

We believe that we can accomplish our goal of improving writing ability by blending technology and pedagogy in a way that will allow computers to be used interactively in writing classes. Because our students are networked during class time, draft in progress can be viewed by instructors and other students almost as they are being written.

Pedagogical Base

In recent years, the teaching of writing at institutions of higher learning has changed dramatically. The once popular approach of teaching writing primarily through editing the finished composition has come under scrutiny. Teachers have discovered that most significant improvements in a piece of writing occur during earlier stages in the writing process. Research clearly demonstrates that effective pedagogical techniques are those that emphasize a four-step process consisting of 1) prewriting (or invention), when such techniques such as brainstorming enlarge the writer's view of the topic; 2) composing, when the writer is encouraged to first freewrite (generate) segments of the piece, then later order and shape the draft according to audience and purpose; 3) feedback, when the writer receives responses from readers and revises to accommodate audience needs, and 4) text preparation, when the writer completes the draft and prepares the finished copy.

It is important that educational programs incorporating computers take advantage of what the hardware has to offer each of these steps in the process--especially in a class setting. Many programs focus primarily on the text revision stage, utilizing word processing capabilities to edit (for example, see Carole McAllister's article "The Word Processor: A Visual Tool for Writing Teachers," *Journal for Developmental Education*, 8:12-15). Usually this approach involves use of computers in an out-of-class laboratory setting. At Mercer, we integrate students, instructors, and technology during actual class time so that work can be monitored throughout the writing process--not merely during the editing phase.

To date, most teachers engaged in teaching writing by the process approach have had to artificially slow down the process in order to interact with students. They have been able to view work in progress only by walking around the classroom and peeking over shoulders, or by collecting working drafts (and thus stopping the writer's work while the papers were in the teacher's possession). The interactive capability of the IWC allows us to promote writing process instruction by facilitating teacher and peer participation throughout the act of writing. Students have access to comments from teachers and peers at the time they are drafting their papers; they can comment on each other's work in progress by asking questions and making suggestions; and they can ask the teacher privately for a response to what has been generated so far. With a few keystrokes or mouse clicks, a paper can be transferred to another workstation or projected on a large screen for the entire class to view.

With the changes in pedagogy and in technology in the last twenty years, many opportunities are available for the meeting of the two areas. Of course students and teachers take advantage of word processing; computers have increased editing power manyfold. However, the student who uses the computer to correct spelling, grammatical, or typographical errors does not begin to maximize the power of computers or of the process approach to writing. The unique mission of IWC comes in its facilitation of networked, interactive instruction though all four stages of the writing process.

Implementation

We selected six target areas for primary application and testing of the IWC project at Mercer: freshman composition, advanced expository writing, basic newswriting, screenwriting, technical writing and professional writing. We selected these targets based on the pedagogical variety provided by such diverse areas, by faculty interest and willingness to participate, and by requirements of Title III funding. Secondary uses will include instruction in other basic skills areas, including reading, analysis, and critical thinking.

While writing courses currently exist in all six primary target areas, experimental versions that utilize the IWC have been designed and taught by faculty trained in the use of the network as well as in process writing techniques in three of the target areas to date (freshman composition, advanced expository writing, and basic newswriting). As a consequence of the various targets, students using the IWC will vary from students requiring basic training in composition, to advanced students who have finely honed expository writing skills, to those pursuing training in very specialized areas such as screenwriting or technical writing. The diversity of these targets allows for testing our approach in a multidisciplinary context consisting of required courses and electives, general courses and specialty courses, lower-division courses, and upper-division courses.

Though courses have been taught in the IWC since January 1987, hardware and software testing, additions, and changes took place until as recently as August 1987. We devoted year one of the project primarily to configuring the physical facility for the classroom, developing training procedures and materials for faculty and students, and testing and debugging hardware and software. Year two we focused on broadening the offerings in the facility and the faculty base using the classroom. In year three, we focused on systematic data collection and assessment of the impact of the project.

Student and faculty response to the IWC project has been overwhelmingly positive. Formal student evaluations of instruction in the IWC almost always emphasize the ease with which work can be revised and the production (with positive consequences) of many more drafts of an individual piece of work than would otherwise be written. Every new faculty member who teaches in the facility marvels at how much more writing is produced by students than in conventional classes.

While the variety of different classes offered in the IWC is limited, we have experienced a high number of repeaters--students who benefit from and enjoy this type of instruction so much that they opt to take additional classes, quite often electives, in the facility.

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METHODIST COLLEGE
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The term Computer-Assisted Composition (CAC) was coined by a faculty member at this small private liberal arts college. Methodist requires CAC in all General Education/Core English courses and integrates the approach in all writing courses in the English, Writing, and Communications majors. Students spend one or two of their required course hours per week in the CAC Laboratory, which has twenty IBM PC's with printers, one Macintosh with a printer, and a Kodak Datashow. Developmental and Core English courses use WordStar or our locally developed heuristics software which teaches the essay in nine rhetorical modes. Much experimentation with commercial software and CAC approaches takes place in upper-division courses (e.g. ThinkTank in Advanced Composition), and some classes are taught entirely in the CAC Laboratory. We also offer the course, "Computer Applications to Humanistic Problems," and publish the National Computer-Assisted Composition Journal.

History of the CAC Movement and of the Methodist College Program

The arrival of the microcomputer in 1977 held special and largely unrecognized promise for the composition teacher. At that point, not many campuses, large or small, were offering mainframe access to any but specialized researchers in traditional areas, though in the mid-sixties a few English teachers had begun to use the mainframe to teach spelling and grammar. CAI, when it was available for English, was already gaining critics.

At the time the microcomputer emerged, I was Director of the Division of Humanities at Bennett College in Greensboro, North Carolina. In a laboratory setting of remote terminals driven by a mainframe, we were teaching not only Core/General Education mathematics but reading and grammar with CAI. Despite territorial disputes and difficulties with both the commercial and the teacher-written CAI we were using, I was convinced that the computer was a tool of infinite promise for our discipline and that it was simply not being utilized to perfection in that particular context. I quickly recognized the value of the microcomputer as an aid in my personal research and surmised that it would be of considerable benefit to student writers. At Bennett, in short order, we wrote a grant and established one of the first microcomputer laboratories in the country (with IBM PC's) and certainly one of the first dedicated to writing; we called it the "Audio-Lingual Laboratory" because it served other subjects, though only English used the computers. We know that what we were beginning was entirely different from what we had been doing in the Mathematics Laboratory, where our CAI program had started, and we were determined to reflect that difference from the outset. Therefore I coined a term to establish our new approach and to distinguish it from what had gone before: CAC (Computer-Assisted Composition) as distinguished from CAI (Computer-Assisted Instruction).

We dedicated one of the three fifty-minute periods of the standard Core/General Education English courses to computer-assisted writing, in which we used IBM's *EasyWriter* word processing program.

I moved to Methodist College as Academic Dean in 1984. In the CAC Laboratory we established, we at first replicated the Bennett experience. We had already learned, however, that we could use the word processing package of our choice (*WordStar*) without having to fear that students and faculty would have difficulty mastering it. What we experienced in those early laboratories is now generally accepted:

- By the end of the second class, with good teacher instruction, even students who cannot type and/or have never used a computer can master word processing well enough to compose at the computer.

- Students can master any word processing program at least minimally by the end of the second class period in the laboratory.

- Instructors should concentrate on teaching students initially only what they need to compose with the present word processing package; that is, they are not teaching word processing per se but word processing tools for writing.

We wanted to move on, to plumb the technology further in order to serve our special pedagogical needs. We came to think of our earlier work as First-Wave CAC and to think of our new explorations as representing a new wave. Second-Wave CAC thus evolved; heuristics-based, it is, at its most formal, the use of specially developed software to tutor students in the composing process. Around the country, a few classroom teachers had begun to envision software that would provide writing aides, e.g., *WANDAH* at UCLA, later *HBJ Writer*; Christine Neuwirth's *Draft* at Carnegie-Mellon; Cynthia Selfe's *Wordswork* at Michigan Technological University; William Wresch's *Essay Writer* (later, *Writer's Helper*) at the University of Wisconsin Center-Bayshore Marinette; Helen Schwartz's *Organize: A Pre-Writing Program for Essays* and *SEEN: A Metacognitive Tool for Active Learning* at Carnegie-Mellon: Wendy Tibbetts Green, Lynn Veach Sadler, and Emory W. Sadler's *Diagrammatic Writing Using Word Processing* (which teaches the essay in nine rhetorical modes) at Methodist. Experimentation with computer applications in many disciplines and in many types of colleges and universities became rife. Probably all of these efforts gained strength from some common sources and understanding: the recognition of the Skinnerian approach of "immediate feedback"; the recognition that computers could "dialogue" with the student; the recognition by academicians that computer programs could stimulate thinking, aid in problem-solving, check spelling, analyze and "grade" writing and help professors compose their own courseware. For our work, these represented important recognitions and directions. Equally important for us was our own experience with First-Wave CAC.

Results of CAC and Its Relation to Standard Writing Approaches

CAC meshes particularly well with the process approach to writing and with collaborative techniques. More important, perhaps, it can encourage students to view themselves as participants in a craft or an art--that is, to think of themselves as professional writers; and it seems to me that the best hope yet of enabling student writers to be both creators and critics/editors.

The results of our experimentation in First-Wave CAC at Bennett were borne out at Methodist and have subsequently also received general acceptance. Those results include direct links with current writing pedagogy:

> *The quantity of student writing increased.* Paragraphs and Essays were at least twice as long as previously, and many of their authors were the kinds of students who had formerly had difficulty developing paragraphs of adequate length.
>
> *The quality of student writing was enhanced.* This improvement resulted from the ease of revision and the willingness of the teachers to accept revised papers. With CAC, I simply circled problems and left students to ferret out what change was needed; they did so--at the level of both surface and deep structure.
>
> *Students took revision seriously.* With CAC teachers found the carrot to get students to confront the corrections suggested on their papers. Students may at first have responded because revision on the computer was like a game, but ultimately they came to care more about their writing and to value the revision most often needed for quality work.
>
> *Writing became a shared experience.* We found students at their computers talking first to their teachers and their Laboratory Director and then entering into dialogues with one another about writing. We and our students became a writing community.
>
> Student's attitude toward writing changed. Mina Shaughnessy points out in *Errors and Expectations: A Guide for the Teacher of Basic Writing* that many of the basic writing students at the City University of New York literally had difficulty manipulating the instruments of writing. Some of those students with whom we worked had similar problems. First-Wave CAC enabled students to produce a beautiful product, and the built-in revision process allowed the majority of them to achieve a sense of perfection or near-perfection that had most frequently eluded them. At the other end of the spectrum, however, we also found changes in the expectation level. Students who were already good writers were freed by the ease of revision to write more and to be more creative. By the time we were working with the students at Methodist, we were encouraging every student who entered the CAC Laboratory for a class to think of himself/herself as a professional writer. Now the developmental English classes at Methodist regularly produce a "magazine" of their work; the idea was their own.

When we founded the Computer-Assisted Composition Laboratory at Methodist, we had already learned that additional boons of CAC could come only if the teacher voiced and stressed them:

> Computer-Assisted Composition can make the student aware of *writing as process* at the same time that it enables the writer to have a measurable outcome, *writing as product*.
>
> Computer-Assisted Composition is an enabling tool that encourages the writer to become *writer and reader* or *writer and critic*. Too often, students consider themselves creative and therefore not bound by normal rules of grammar, or, contrastingly, they are so conscious of grammar that they cannot cease to edit and either write very little or stay at the level of minutia. In *Writing with Power*, Peter Elbow speaks of the two conflicting skills required in writing: the ability to create and to criticize. In the more recent *Embracing Contraries* he speaks of the ability of good writers to be creative and critical at once. Almost unconsciously and certainly naturally out of the experience in our CAC Laboratories, we coined terms that speak to Elbow's perception of the writing process, terms that help our students to understand and guide their own processes. We introduced students to "brain dumping"--keying in information and ideas as they occur without considering the form or the order.* The students learn to let themselves be free to "create" as an idea takes them, indulging their creativity yet confident that no idea, no matter how important (or unimportant), will be lost and that it can be moved at any time to any part of the text being built. When they are ready, whether in the middle of the creative phase or after it is thought to be over, students become textual editors, looking with a critic's eye at the construct before them, trying different version of a phrase or a paragraph or the structure of the whole and saving all of the version, if they wish, for comparison. We tell them, quite simply, that in the CAC Laboratory, they are for the first time "patting their heads and rubbing their stomachs" (being creators and editors) simultaneously. We also go on to explore, briefly, the possibility that they are unleashing both their left- and right-brain forces. The computer, we tell them, is a technological tool that allows its user to be both writer a creator and writer-become-text editor/critic/reader. It does indeed abet this complexity. As one writer has suggested, as he reads a printout "...I do not feel as if I am reading text again; rather, I feel as if I am reading a text for the first time, for it is the first time I have seen it in that physical form." "Writing on the computer...allows me to separate my creative and critical skills more completely than I was ever able to do before."

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* Soon after I coined the term, incidentally, our President received a letter from a president in Virginia saying that he had heard about all the "brain dumping" going on at Methodist College and had just one question: What did we do with all the faculty after their brains had been dumped? We also celebrated the opening of the CAC Laboratory with a "Perfory Cutting." Since then, two students stayed up almost all one night making perfory and ribbon runners and bows for a Christmas tree for me. My husband and I have had a perfory tree for the last three years.

The Students and the Courses

CAC is the standard approach in English and in writing at Methodist College. While we allow for flexibility in teaching, we encourage all students to consider the computer as a tool for writing and request that they write at the computer, not bring in written drafts and use the computer as a technologically glorified typewriter.

All of the students in the three-hour Developmental English (English 90) and in one of the General Education English courses (English 101--Composition) at Methodist have one hour of CAC per week and two hours in the regular classroom. In addition, CAC is the approach in 102 (Composition and Introduction to Literature, also required in the Core), 317 (Reviewing Writing, a course for those who fail the English Proficiency Examination, a graduation requirement), 320 (Business English), 323 (Advanced Expository Writing), and throughout the courses in our Writing major (e.g., Technical Writing, Creative Writing: Fiction, Creative Writing: Poetry, Creative Writing: Drama, Feature Writing for Popular Magazines, Theories of Composition, and Computer Applications for Writing). Each fall, we typically run two sections of Developmental English and twelve sections of English 101, of twenty students each, during the day; students in our Evening College Program also meet for one hour per week in the CAC Laboratory.

In the spring of 1987-88, we offered for the first time English 485 (Computer Applications to Humanistic Problems), a combination laboratory-lecture course asserting the primacy of "computers and the humanities" as a discipline. After an overview of data processing with an emphasis on the use of computers to solve humanities problems, particularly literary problems, the course turns to programming in SNOBOL4 (on the IBM PC), and students use the programming skills they learn to solve problems and complete individual projects connected with stylistic analysis, textual editing, concordance creation, and other tasks. A final section introduces the class to desktop publishing with the Macintosh and the laser printer and the use of HyperCard for humanities projects.

We are also raising at national conferences an issue brought to bear on the Methodist College campus by computer permeation of the Humanities: the need to think seriously about increasing the standard three-hour writing course to six hours and patterning it after the science laboratory course, with four hours of credit for three hours of lecture-discussion and a three-hour computer laboratory.

Classroom and Laboratory

Our standard approach for a three-hour course is fifty-minute session per week in the CAC Laboratory and two fifty-minute sessions per week in the regular classrooms. We limit the enrollment in the English class to the number of microcomputers available in the laboratory (twenty), and the English teacher is thus with his/her students during the class and the laboratory hours. We have run some experimental classes (e.g., Advanced Composition centered on grants writing) for three hours per week in the CAC Laboratory.

Hardware and Software

The CAC Laboratory is equipped with twenty IBM microcomputers. Students use *WordStar* if the approach is First-Wave CAC or our own package, *Diagrammatic Writing Using Word Processing*, when, as in one of our required General Education English courses, the approach is Second-Wave CAC. We have combined First-Wave CAC (*WordStar*) with a grammar program (e.g., Little, Brown's 1987 *Grammar Lab*) or an editing program or with a Second-Wave CAC tutoring package in writing and have combined both kinds of CAC with traditional approaches: *WordStar*, *CorrectStar* (Micropro's spell-checker), *RightWriter* (Decisionware's editorial software), and two complementary texts--Maxine Hairston's *Successful Writing* and Edward P.J. Corbett's *Classical Rhetoric for the Modern Student*. The results are described in an article forthcoming in *Collegiate Microcomputer* (Greene and Sadler). Soon after the first idea processor, *ThinkTank*, came out, we received it free from the company in exchange for adapting it to the college setting (the Advanced Composition class at Methodist) and publishing the results*

The Effect of CAC

Methodist College is probably atypical in having come to computers largely through the disciplines of English and other humanities areas. Our technological leader remains English (though we have a Computer Science major); and we publish the *Computer-Assisted Composition Journal* and organize the "Computers and the Humanities" Strand for the Popular Culture Association. We also held the first state-wide conference in North Carolina on computer applications for education. Most recently at Methodist, we have reached the point that humanities students and faculty are voicing their claims to computer technology as a virtual birthright. We offer an example of what can be done by a small college to adapt emergent technology for education.

Indeed, a special boon of the CAC Movement is that it has produced excitement about learning and experimentation in students and faculty. In the best of collegiate atmospheres, inventiveness yields inventiveness. Accordingly, the computer-based approach to composition is producing spin-offs for the humanities in general. At Duke, an English professor is using a Kurtzweil scanner to convert novels to the computer for student analysis.** The Farrell School System in Pennsylvania enables four to twelve students to converse online with an English professor at the Shenango Valley campus of Penn State about their creative writing projects.*** Data-base projects on Milton and on the Renaissance are being done by the students of one of my friends in Canada. I am working with two of the participants in an National Endowment for the Humanities Summer Seminar for College Teachers I directed on "The Novel of Slave Unrest" to establish a database of effectively "lost literature" on that topic.

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* Kimball, Sue Laslie. "Idea Processing with *ThinkTank* in Advanced Composition." *Computer-Assisted Composition Journal* 1.1 (1986): 34-41.

** Mellown, Elgin. "The Use of the Computer in Literary Studies: An Experimental Course" *Computer Assisted Composition Journal* 1.1 (1986): 55-61.

*** Tamplin, John C., and Donna DeBonis. "High School Goes to College for Computer-Based Creative Writing." *Computer-Assisted Composition Journal* 1.2 (1987): 149-57.

One of the principal effects of CAC is its strange ability not only to infect faculty and students but to maintain its contagion. At Methodist, primarily as a result of CAC, we have achieved campus-wide interest not only in "Writing across the Curriculum" but in "Speaking across the Curriculum." We have plans to adapt our in-house software (*Diagrammatic Writing Using Word Processing*). As a result of his interest in CAC for his own research, one of our bright young scholars, a philosophy professor, has founded the Writer's Guild for faculty. Recently he went to Brooklyn College for a conference on its well-known Core Curriculum, and promptly interested that institution in CAC. At the discipline level, student response to CAC has been so enthusiastic that the English Department has introduced a major in writing. Now, the most recent significant computer flowering, desktop publishing, has enabled us to produce the national *Computer-Assisted Composition Journal*, which we believe to be the first full-length academic journal done with desktop publishing, and then to take on, in house, 98% of the College's publications. Desktop publishing enabled us to create the Methodist College Press (and to begin to publish the annual proceedings of the Consortium for Computing in Small Colleges). We would not have had desktop publishing on the campus without the involvement of individuals in the CAC Movement. Our thrust is campus-wide, even off-campus, involvement; the aim is synergism.

The Importance of CAC

CAC is having a profound effect on student attitudes toward writing and on the teaching of writing. Also, CAC makes clear what teachers knew all along: that writing is recursive, not linear. Especially in the area of invention or prewriting--unsystematic heuristics (e.g., brainstorming, freewriting, journal keeping, free associating, braindumping)--the teacher can intervene earlier and more effectively, can influence the way the writing problem posed or presented and see that the student writer is focused on the problem, and can even aid the student to think about his/her cognitive style. We are, moreover, already overcoming the criticism that word processing software was developed for technical writing applications and, accordingly, that structural issues are ignored or are absent. We now have outlining modes and multiple windows that provide direct or random access to the text and overall structure rather than only scrolling or sequential access (a problem discussed by Pfaffenberger*). Our own software package, *Diagrammatic Writing Using Word Processing*, takes a different approach to achieve the same end by keeping each major piece of the text (e.g., thesis, topic sentence for each body paragraph) in front of the writer as the next piece is being worked on; a principal intention is to preserve the writer's "larger vision" (the term is

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* Pfaffenberger, Bryan. "Word Processing and Text Revision: Interpreting the Empirical Evidence." *Computer-Assisted Composition Journal* 1, Number 2 (1987): 105-18.

Hitchcock's) of the writing-in-process.* We should also keep in mind, moreover, that this limitation--the inability to view large portions of the text on the monitor at one time--is a boon for basic or developmental writers, who are thus not overwhelmed by immersion in the full text. We still must find a solution that will collapse the time float between the acts of composing and of producing a printed, authoritative-looking document.

Critics no longer can claim that the lure of the technology is the only or main reason for the success of CAC, then. The microcomputer is a fact of the present life of students; we will not go back to life before it because, for one thing, they will not let us go back. Other criticisms are more problematic. Some continue to worry, rightly, that surface and not deep revision is affected and that the authority of the printed word discourages students from tampering with their drafts. The former rests in the hands of the teacher and, indeed, is one of the reasons why the computer will never replace the teacher. Similarly, the teacher offsets the charge that some students simply become more circumlocutory as they indulge themselves with computer-aided writing. The problem of the authority of the printed work I see as an important opportunity: critical thinking may well be enhanced as students, having learned from skilled and caring teachers to question their own printed word, learn not to regard words as the last word--just because they are in print. Newspapers, magazines, books--all these, one hopes, students will come to read with a greater critical sense. If it is true that electronic text has a different mode of existence,** CAC may well contribute to changing the very way we think. Certainly, Ellen Nold at Stanford has been working in that area since the early 1970's. When voice synthesis is domesticated, moreover, we may well find the computer teaching us, indirectly, ways to integrate the faculties as writing, reading, and listening become inseparable for the writer. Most vitally for me, perhaps because I have spent a great deal of time working with minority and developmental students, I have great hope that CAC and the emergent move toward reading and writing-intensive electronic classrooms will have the effect, as one scholar puts it, of minimizing cues of gender, age, and social status and placing the emphasis on what is said rather than on who said it.*** New efforts in collaborative writing are also in the offing as electronic mail, modems, diskmailers, and disk- and block-swapping become more commonplace. Curiously, perhaps, given the original fear that computers would turn us in on ourselves and the machine, computers may actually reduce other barriers between students and between students and teachers.

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* Sadler, Lynn Veach, Wendy Tibbetts Green, and Emory W. Sadler. "Diagrammatic Writing Using Word Processing: *Larger Vision* Software." *Research in Word Processing Newsletter* 4.1 (1986): 2-7.

** Meyrowitz, Joshua. *No Sense of Place: The Impact of Electronic Media on Social Behavior*. New York: Oxford University Press, 1986.

*** Selfe, Cynthia. "Computer-Based Conferences and the Non-Traditional English Classroom." Lynn Veach Sadler, Chair, "Symposium: Computer-Assisted Composition." IBM Academic Computing Conference. Dallas, Texas, June 18-20, 1988. Forthcoming in *Computer-Assisted Composition Journal*.

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UNIVERSITY OF MICHIGAN-ANN ARBOR

ANN ARBOR, MICHIGAN

At this large public research-oriented university, any instructor can reserve class time in either a Mac or a Zenith lab. Instructors for all undergraduate writing courses are encouraged to use a new lab equipped with twenty-five networked Macintoshes. Both MacWrite and Microsoft Word are available, as are locally developed applications of Hypercard. This central computing lab becomes a drop-in writing lab after hours, staffed by faculty and/or peer tutors.

History of the Program

The Computers and College Writing Program at the University of Michigan began to take shape in early 1986 when a group of writing teachers decided to apply for some research money to study the effects of word processing on students' revising. At that time, the University's Division of Information Technology (ITD) had begun to take ambitious steps to create a computer-supported campus environment. Students in our writing courses had access to computers at public stations around campus, and they were using them. What effect, we wondered, were these changes around us having on our students' writing?

In that initial study we found that students using word processing outside of class were making more revisions than students who used typewriters; those revisions, however, did not necessarily lead to better final drafts. But what happened to student writing when writing classes moved into computer labs. To answer this question we requested money to do another study. The second study, done in 1987, involved a group of about ten teachers, the nucleus of those in the writing program interested in computers and composition. We learned what in hindsight we might have known: simply moving writing classes into computer labs is not enough--to make effective use of technology, to insure that technology supports the goals of a writing class, teachers need training and support as well as facilities designed to accommodate the dynamics of a process-based writing courses.

Those of us who moved into computer labs as part of this study did it as an experiment--we had no training in how to incorporate computers into writing courses other than our experience using word processing. Our efforts to bring together our aims as teachers and our experiences as individual writers were confounded by the fact that the labs we had access to had been designed to maximize space rather than to facilitate group interaction. Consequently, when we were in the labs we found that we were doing more individualized instruction and less group discussion, even though all of us had come to value developing a sense of community among our students, which discussions, of course, help to generate.

Because of what we learned in our second study about the lab as a teaching environment, we were able to make recommendations to the University about the kind of classroom we needed--a classroom in which computers are arranged around the perimeter, with tables in the center. And in December, 1988, a lab designed particularly for writing classes opened. We have also argued, successfully, that scheduling of this lab during regular class hours (8-5 Monday to Friday) ought to be handled by the staff people in the writing program. The effect of this policy will not only be that writing teachers will be the primary users of the lab, but also that teachers can schedule time in the lab on an occasional basis. Under the present system, instructors must either bid for a lab for every class session or take a chance that a lab will be open on the day they want to use it. Finally, we argued that teachers need training in order to take full advantage of the resources of a computer lab and in August 1988 we were able to bring a computers-and-composition consultant to campus for a two-day workshop for about twenty writing teachers.

Until now, most writing faculty have been relatively unaffected by the presence of computers on campus. Individual teachers decided whether they wanted to introduce students to word processing, and whether they wanted to hold class in labs. Many teachers did suggest students learn to use word processing; many fewer (no more than fifteen) elected to hold class in computer labs. Students' reactions have generally been positive--they like using word processing, and as they continue to get easier access to computers, they use them.

The main problem we faced as we began to develop a computers and writing program was a lack of identity. Computers were being installed on our campus without our input; since we in the writing program did not have to ask for this technology, we never had the opportunity or the need to draft a statement about what we wanted, why we wanted it, or how we would use it. Instead, computers simply sprang up around us. Consequently, we found ourselves surrounded by public stations (ITD had a goal for achieving a 1:13 student to computer ratio), and by computer classrooms that were not designed for writing classes. In a computer-rich environment, we had to find our identity as technology-users. We had to do this quickly if we wanted to be recognized as participants in the increasingly important conversation about the role of technology on our campus.

Computer Support for our General Approach to Writing

Writing teachers at Michigan have been attracted to computers because of their own experiences with them. Our approach to writing here emphasizes process and teachers who have used word processing know that it can make revision much easier. Many of us want to share this powerful tool with our students.

At the same time, however, our writing classes tend to emphasize the development of classroom community and collaborative learning. Some instructors have felt that computers hinder that development. In our second study, for example, teachers reported that the primary mode of instruction in their classes was individual, and little group interaction took place. Of course, the set-up of the labs we had available probably contributed to the problem. Computer conferencing appears to counter this tendency of computers to isolate writers. At least thirty writing instructors now use *CONFER* as part of their course, and we also hope that the new lab will be arranged around the perimeter of the room, with tables in the center.

Courses Involved in Computers and Writing

Any instructor in the writing program has the option of using computers in their class. The classes which have elected to meet in computer labs range from tutorial writing courses, to introductory composition, to advanced composition. The number of student using computers for writing is harder to estimate, because students have access to computers all over campus, including in their residence halls. We have asked the College that the lab we use for teaching during regular class hours be used as a computer-based writing center after class--during the evenings and on weekends. (The original plan called for the computer classroom to revert to general public use after hours, and the only assistance available to students would be technical.) Like the English Composition Board's writing workshop, the lab would be available to any student enrolled in a course in the College of Literature Science and the Arts. We believe that a computer lab staffed with writing faculty could play a key role in supporting writing across the curriculum, since faculty members would be able to refer individuals or entire groups of students to the lab for help with particular assignments.

What Goes on in Computer Writing Classes

In our study of writing classes meeting in labs, we found that at least half of class time was spent writing, while the instructor circulated to offer individualized assistance. Some instructors have had peer editing groups work with disks, with mixed success because students report they don't like reading papers on the screen. Other instructors project a computer screen to a large screen to demonstrate the effects of various revisions. Most of the time, however, students use computers in class for drafting, revising, and editing their papers.

Hardware/Software

Our campus is equipped with both Zeniths and Macintoshes. Students appear to prefer the Macs, and so we asked that the writing program's lab be equipped with Macs. Both *MacWrite* and *Microsoft Word* are available at public sites. Most computer classrooms are tied into the mainframe, and our new Mac lab will be networked.

Effects on Students and Faculty

The effect on students of using computers for writing seems to be that they learn to like writing more than students who are not using computers. In the first study we did, with six sections of introductory composition, we found that all students liked writing more at the end of their writing but the attitudes of those students using computers for writing improved more than those of students who were not using computers. We cannot make claims at this time that computers help students write better, at least within the time frame of one semester, but we suspect that in the long term computers will be beneficial.

The effect of computers and writing on faculty has been different, and more strongly positive. For one, because we were interested in learning more about computers, we were able to start a group of teacher-researchers--teachers who had not previously been involved in writing research. Second, because we found ourselves having to bid against other departments in order to get the kind of computing facilities we needed for writing classes, people heading different parts of the writing program had to act in concert. Establishing a computers and writing program has become a highly visible collaborative effort on the part of the entire writing program.

As we go forward with this project of incorporating computers into our writing classes, our effort will gain pedagogical and intellectual importance. Once we have teachers comfortable with word processing, and familiar with the features of the computer lab, we will begin exploring more innovative uses of information technology. Right now, we can use computers to support what goes on in our traditional classes. But we are getting more curious, more adventurous.

What else can we do with these powerful machines? In the near future, we will be exploring ways to harness the resources of computers to accommodate various learning styles of student writers as they make their ways through discipline-specific writing tasks. Faculty in the writing program will be collaborating with colleagues across the University, and students in introductory writing courses as well as those in advanced classes will be the beneficiaries as all of us learn more about writing and learning in academic settings. Once again, we expect that computers will become a vehicle for fruitful collaboration.

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MIDDLEBURY COLLEGE
MIDDLEBURY, VERMONT

Freshman at Middlebury, a small liberal arts college, enroll in both a writing course (selecting from a broad range of offerings and discipline emphases) and a freshman seminar, a thematic writing-intensive course that attempts to connect traditional disciplines. Building on the success of computers in Middlebury's Breadloaf Program, the College has integrated computers into the freshman writing course and freshman seminars, orienting freshmen to word processing before fall classes begin and supporting the use of word processing through instructor's initiatives. The writing program uses both Macintosh and IBM networked microcomputers, and Microsoft Word *for word processing.*

A Short History

Through all the curricular changes of the 1960's and 1970's, Middlebury College faculty held fast to the requirements that all students, no matter what the SAT score or AP credits might be, must complete a one-semester writing course before the end of their third semester. For many years, most of the instructional burden of this requirement was borne by our Departments of American Literature and English. In 1979, however, in the course of examining this requirement, the faculty endorsed the concept of writing across the curriculum and pledged to broaden the course offerings by which freshman could fulfill the writing requirement. Since then, writing courses have been offered by the Departments of American Literature, Art, Biology, Chemistry, Chinese, Classics, English, French, Geology, History, Mathematics, Music, Philosophy, Physics, Political Science, Psychology, Russian, Sociology/Anthropology and Theatre. The size of writing sections is kept to fifteen students; regular writing and frequent rewriting are required; peer critiquing and individual conferences between student and instructor are expected.

In 1986 Middlebury received a five-year grant from the Pew Memorial Trust to inaugurate a program of freshman seminars. Though voluntary until recently, freshman seminars became a first semester requirement for the entering class in September 1988. The seminars have been defined by the faculty as small (thirty-three sections, fifteen students each), thematic courses which attempt to make connections among a number of traditional disciplines. Since freshman seminars are to be writing intensive, students will now have two courses emphasizing writing during their first three semesters at Middlebury.

Instructional Theory

In the spring of 1985, inspired by the successful use of computers at Middlebury's Bread Loaf School of English, we launched an experimental program that sought to combine the teaching of writing with word processing and networking. The aims were simple: to help freshman develop a role for the computer in their lives as maturing writers; to explore with them the computer's potential for enhancing collaboration in the classroom. We wanted to encourage, at the very start of our students' college careers, the interplay of voices that gives vitality to the academic enterprise. We agreed with Kenneth Bruffee that "the first steps to learning to think better are learning to converse better and learning to establish and maintain the sorts of social context that foster the sorts of conversation members of the community value."

We also gave careful attention to the design of the space in which our project would be carried out. Writing courses using computers meet in a large classroom equipped with eighteen Macintosh Plusses, three Image Writers and a hard drive unit which serves our *AppleShare* network. The computers are placed on tables around the perimeter of the room, while a table in the middle of the room and chairs on casters allow students either to face each other during discussion or work at the machines alone or in small groups.

Over the past two years, faculty interest in such a facility has grown significantly. In the first year, only two faculty used the room for their writing classes: this year there are a dozen using it; and more writing instructors indicated an interest in using networked computers for their courses next year. To accommodate this expanding interest, we have two more computer classrooms now under construction.

Classroom Practice

Beginning this coming fall, we will introduce the basics of word processing in a series of pre-seminars during Freshman Orientation in the week before classes begin. By the time classes have officially started, students can immediately begin to carry out their daily exploratory writing and corresponding using networked computers. This method of networked exploring and corresponding used in our experimental computer courses grows out of experiences at Bread Loaf and is further explored in our book, *Word Processing in a Community of Writers**.

We begin by explaining to our students that they are responsible each week for making five exploratory entries on their disks. These entries are modeled on freewrites of the Elbow/MacCrorie sort, though they are formed into a somewhat more focused and continuous sequence. Students essentially plunge into exploration of subject matter from the course, issues raised in class discussions, what is going on in their lives or in the world around them, what they notice, what they feel. Not all of these entries develop further, but some of them do serve as seeds for the five to six formal essays students are required to produce in a writing course. Those formal essays, it turns out, often grow organically from the exploratory writing on the computer. As they experiment with this organic method, students begin to notice that writing becomes easier, that they have more to say, that their voices sound less stiff, and that the speed of the computer brings writing and thinking closer together.

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* Elder, John, B. Bowen, J. Schwartz, and D. Goswami, eds. *Word Processing in a Community of Writers*, Garland Publishing Inc.: New York, 1989.

By the end of the second week we introduce corresponding. Each member of the class responds to two other students' weekly collections of explorations--not evaluating them on the level of organization or correctness, but simply indicating which elements were interesting and where they think the writer might do more. This use of *AppleShare* has eliminated swapping disks or handwritten journals, and it has simplified record keeping. Instructors can browse through and comment on their students' writing at a terminal and periodically print copies of entries or responses.

We had intended the networked corresponding as roughly one-third of the course work. We soon discovered, however, that the energy and creative collaboration generated by this system penetrated every aspect of the course, both inside and outside the classroom. We have found that by combining word processing and collaboration on the network we can give novice writers a sense of their own writing processes and help them become much more aware of their audiences. We can encourage novice writers to identify, connect, and deepen promising material, and we can help foster a sense of writers' community which values writing as a tool for learning.

Hardware and Software Availability

We have established, and continue to support, the presence of both Apple Macintosh and IBM microcomputers on campus. We have chosen to support Microsoft Word, a word processor which has similar versions for both classes of machines. Academic Computing offers instructional seminars for all interested students, faculty and staff so that instructors need not use classroom time to teach computer skills.

The public computing facilities here consist of the VAX 11/785, fifty-five DEC Rainbows (which we are steadily replacing with Macintoshes and PC's), fifty Macintoshes and seven IBM XT's. The library runs it catalogue and bibliographic search software on a separate VAX 8200. The micros are concentrated in seven labs, spread out across the campus. Some of the labs are used primarily as writing classrooms for courses using computers, and the rest are general work areas. The computers in five of these seven labs are connected to the VAX's by multiplexers so that they can also be used as VAX terminals transfer files to and from the VAX and utilize the online capabilities of the library's software system.

There are currently *Apple Talk* networks in two of the labs (used primarily to share printers), and the *AppleShare* networks in our writing classrooms. In September our new computer center will open and we will have about forty more public microcomputers and two more computer classrooms. Just as important, we will have installed an adventurous network which will include greatly expanded file server capability. The current writing classrooms, although not in the same building, will be connected directly to this network. We will thus be able not only to expand the current use of computers, but also to support new initiatives which instructors may wish to explore.

After three years of personal computer sales on campus, individual ownership of microcomputers contributes significantly to the computing facilities at Middlebury. Although accurate figures are hard to obtain, we estimate that about fifteen percent of our 2,000 students have computers in their dorm rooms. Moreover, a microcomputer can be connected to the VAX through the College phone system (without using a modem) from any office or dorm room on campus. Any machine which has access to the VAX can also be connected to the library's online catalogue and search facilities or to BITNET. There are no College restrictions or charges to students for any of these facilities.

Program Assessment

The general principles of nurturing faculty and encouraging students have thus far shaped our approach to assessing the work being done in our writing courses. Because we believe that the complex mental processes involved in producing good writing extend far beyond the learning of grammar rules or the structural principles of the academic essay, we have attempted to evaluate the success of our program from a number of points of view. Throughout our course we do extensive formative and summative evaluation using student self-assessment, peer assessment and instructor assessment. Specifically we ask students to assess their own writing three times during the semester and to meet with their instructors for assessment conferences at the beginning, middle and end of each semester. For the mid- and end- semester conferences students submit portfolios of formal essays developed from their networked corresponding and already critiqued by their peers. In addition, during the semester the Director of Writing conducts regular faculty development lunch/seminars at which instructors discuss pedagogical issues.

We find the student work produced in these courses gratifying both in quantitative terms (student average 120-130 pages a semester on the network) and in terms of the energy and polish of the students' revised formal essays. Students are indeed accumulating an impressive repertoire of writing strategies, which many of them learn from each other. But just as important is the sense of commitment and collaboration generated in our community of correspondents. In their exploratory entries, class members often note the value of "getting to know the people in class through their entries" and "an unspoken trust" established between writer and correspondent, one that carries over into classroom discussions as well.

What our students notice and what we find is that computers can help us create a classroom environment in which the level of challenge and the expectations for success are high, yet levels of anxiety--those "affective filters" which language acquisition theorists tell us hinder language growth--are negligible. Writing on networked computers can actually lower students' anxieties and improve in-class discussion, and those early "getting to know the machine" sessions can even help establish a coaching role for instructors, which evolves nicely into the editors roles we assume later.

We are now ready to move on. Faculty in our writing program have begun sharing their findings in articles and conference presentations, and we are prepared as an institution to share our own experience and to profit from the insights of others.

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MITCHELL COLLEGE
NEW LONDON, CONNECTICUT

At Mitchell, a small private two-year liberal arts college, students in basic and expository writing courses meet at an IBM AT compatible microcomputer lab where they are guided through WordPerfect software and are given writing practice using a set of structured exercises. The lab features a data security program, a large screen projection system and a link network for video communication among computers. After initial instruction, students use open lab hours to practice the revising and editing phases of the writing process.

History

Mitchell College is an independent private, non-profit, two-year college for men and women serving resident and community students since 1938. The College offers a wide range of courses in the humanities, as well as in business and technical areas, to approximately five hundred and thirty full-time day students and an equal number of Continuing Education students.

Mitchell continues to be forward thinking in its academic programs and formats. This is evidenced by the introduction of a new microcomputer lab facility for academic departments and the introduction of word processing in the freshman English curriculum.

The introduction of word processing into the freshman writing curriculum began in November 1986 when the Director of Academic Computing, overseeing the existing prime minicomputer lab, won approval from the Dean of the College, the President and, subsequently, the Board of Trustees to establish a microcomputer lab facility. Approval was sought in part because of the need within the business, engineering and math programs to take advantage of the unprecedented advances in the capability of microcomputers. But equally important was the rationale that all students should be able to use a microcomputer. It was thought that the place to start would be with word processing, a useful skill relevant to all students across the disciplines.

Putting the program together posed a number of challenges:

1. Introducing word processing *en masse* without disturbing the curriculum presented a problem. Creating a word processing course required of all students offered one solution. But imposing a new skills course with extra credits on an already tight academic curriculum raised problems of its own. The solution has been for the Department of Academic Computing and the

Department of English/Language/Fine Arts to collaborate on redesigning a portion of the introductory writing courses so that they now accommodate a word processing component: Since most students take the introductory courses (EL100--Review English, or EL101--Expository Writing), and since the classes are usually taken in a student's first semester, introducing individuals in these courses to word processing provides computer lab and word processing exposure to the most number of students at the earliest possible time. In addition, using word processing allows instructors and students to explore teaching and learning with computers and to bring the benefits of computer produced writing into their composition classes. Finally, because EL100 and EL101 are established courses, the overall curriculum is not disturbed.

2. Another concern was the problem of site design. The micro lab was carefully researched and designed after several members of the College administration and faculty visited various computer facilities. Paul Waldron, Head of Engineering and Physical Science at Mitchell, and Bruce Lawson, Manager of Computing Services at the Hartford Graduate Center, were particularly helpful. The result is a spacious layout that can serve as a full teaching classroom and significantly enhance classroom instruction. The four computer rows, for example, face the instructor's master workstation in a symmetrical arrangement providing direct eye contact with each student. The Center or master aisle has a large screen projection system, with a marker board on one wall and an overhead projector on the opposite wall. A large bulletin board is also prominently displayed. The teacher thus has a traditional classroom and yet is at the center of the workstations. The room, moreover, is appropriately trenched for proper positioning of cabling and outlets, which are out of the way beneath table level. The design of the room further allows for networking of the computers in the future. Also of note is the large screen color projection system, which allows instructors to show on the large screen whatever is taking place on the instructor's screen. Additionally, a video networking system for color monitors, purchased at a relatively modest price, has been added. With this Link video system, instructors are able to view student screens at the master workstation; they are also able to send the master screen to student screens and to switch a student screen to the screens of other students. Moreover, any screen may also be viewed with the large screen projector.

   To further maintain an effective classroom environment, the lab is amply equipped yet not overcrowded. To strike a balance between the ideal and the practical, there are no more than two students per machine during class sessions. For this reason, the micro lab has fourteen student stations and one instructor station at present. Four more computer stations will be installed for a total of eighteen student stations. Many of our writing classes are small enough so that we can place one student at each machine. We do have larger classes, however, that can approach twenty-five to twenty-eight students. In such classes we seat two students per machine. (We are now working to reduce class size in these larger sections to approach the one student/one machine ideal.)

3. Another problem was selecting a suitable software package. For this, the Director of Academic Computing formed a representative committee of seven persons from a cross-section of academic and administrative

departments. Each committee member presented and evaluated a different package. The two packages deemed most appropriate for the Mitchell program were then submitted to students for their evaluation. The software program finally selected was the full version of *WordPerfect*. It was thought that this full version program is sophisticated yet sufficiently easy to use and that it best represents the type of software students are likely to encounter in their careers or at other colleges and universities.

4. Another problem was security for machines and software. Aside from the obvious precautions any prudent person would take to secure a room, a Watchdog Security program was installed on each machine to protect the operating system as well as the application software. Also, each department had customized menus written for it, thus ensuring that a user can get into an application without detailed computer knowledge. Students are also asked to sign a pledge to safeguard equipment and software.

5. The problem of scheduling was resolved by opening the lab seven days a week with twenty-five to thirty hours of open lab time in addition to class time. To avoid confusion, the English/Language/Fine Arts Department head and the Director of Academic Computing arrange a schedule of orientation sessions: during the first few weeks of the semester, instructors meet with their class in the computer lab for two or three sessions totaling three hours.

6. The most important consideration was, of course, the response of students and instructors. Problems here were keeping students focused on the task, helping students by making reference materials and disks readily available, and encouraging and supporting faculty. Assuring the availability of reference materials was easy. Reference books such as dictionaries, grammar and research handbooks, and a *WordPerfect* handbook were placed on a table in the lab for easy reference. Each keyboard was supplied with a template clearly showing how to operate important functions. The college bookstore agreed to maintain a supply of disks and *WordPerfect* materials.

   Problems expressed by faculty concerned the loss of valuable class time teaching word processing rather than writing; and faculty were also concerned about the time involved for them to learn about the software and hardware. These problems were eased by the introduction of extended and abbreviated faculty workshops conducted by a word processing instructor several times throughout the year. A word processing instructor was also engaged to instruct the writing class orientation sessions with the teacher present to assist by maintaining order and helping to work with students on the lesson at hand. Detailed labs have also been written by the English/Language/Fine Arts Department head and the Director of Academic Computing. These highly structured labs are designed to guarantee that students will learn word processing skills for the purpose of revising their writing with an editor's eye for correctness, clarity, style, unity and coherence. Finally, trained part-time lab assistants, many of them students, are required to complete a faculty/staff Workshop in *WordPerfect* and are on duty during open lab time to assist in any way they can.

Mitchell's Approach to Word Processing and Writing

The basic writing courses in the English/Language/Fine Arts department employ process oriented writing instruction. In general, students have responded well to this kind of instruction, being especially interested in working on the initial stages--the thinking, planning and rough draft stages. One problem, however, has been that students resist the final step in the process--editing to assure that paragraphs are coherent and that sentences are clear, correct, concise and emphatic.

One important benefit of including word processing instruction in our basic writing classes is that the computer allows student and teacher to concentrate in an efficient and memorable way on revisions. That is, they can deal better with editing tasks and the skills required for these tasks.

Student Enrollment

As already noted, students in basic English (EL100--Review English, and EL101--Expository Writing) are required to learn the elementary function of *WordPerfect*. This involves 400-500 students in peak semesters. It should also be noted that all Introduction to Data Processing classes include a word processing unit, as well. Thus, at any one time, a large percentage of the student body is involved in word processing instruction.

Computer Writing Classes: Content and Procedures

For purposes of instruction, the following format is in effect:

1. Each course includes three hours of computer orientation sessions per semester.

2. In lab 1, students learn to format a disk, log in and out and perform basic editing operations on a short paragraph which they enter on their disk. In lab 2, students are shown how to retrieve documents and are given paragraph and improve the wording according to specific instructions: additional word processing features are also covered. In lab 3, students are required to compose a third paragraph from a given set of randomly arranged sentences; this paragraph must be completely integrated with the preceding two paragraphs in tone and focus. To do this, students must combine, reword and rearrange sentences; they must create transitions, add detail and make other modifications; students are then asked to spellcheck and print the final document.

3. After each lab, students are asked to return during open lab time to polish, redo, or repeat the lab involved.

4. Instructors collect and evaluate printouts and supply students with feedback on the quality of their writing and editing efforts.

5. After these orientation sessions, instructors are encouraged to assign at least one more revision exercise of any kind (change passive voice to active voice, eliminate weak verbs, create sentence variety, eliminate deadwood, supply coherence, etc.) to be done in open lab and turned in for a grade.

6. Students are encouraged to write and revise at least half of their essays and paragraphs in the computer lab throughout the semester.

7. Students are also encouraged to meet with instructors in the lab during open hours for office conference and further instruction.

We have found it best to use the following guidelines with the format:

1. If some students must work two to a computer during orientation sessions, each student should split the work fifty-fifty.

2. If an exercise contains misspellings or sentence blunders and punctuation errors, the instructor should supply a disk with the exercise on it so the student does not have to type in errors. (The student can then call up the exercise, edit it and print it for the instructor without reinforcing bad writing habits that might be picked up if students type in errors. When the exercise is complete, students may transfer the results onto their disk for study.)

3. Students who miss class should make up the lab in open lab time with the help of a lab assistant.

Hardware/Software

Following is a list of hardware and software relevant to our writing program:

Hardware:

15	Zenith Z-248-84 computers with 40MB hard disk, 1-360K floppy drive, 1-1.2MB floppy drive, 1MB RAM, 2 serial ports, 1 parallel port, graphics board (EGA/CGA Standard)
15	Mitsubishi XC 1410 color monitors
15	Irwin 445-AT-external (40Mb) tape interface cards
(4 Workstations to be added)	
8	Math co-processors 80287-8
4	Irwin 445-AT-external tape drives
1	NEC P7 dot matrix printer with bidirectional tractor feed
8	NEC P6 dot matrix printers with bidirectional tractor feed
8	Summagraphics MM 12011 digitizers with four button cursor/stylus and power supply
1	Ioline LP3700 plotter with hyperbuffer
1	Sony VPH-1030QI video projector (ceiling mounted) with remote control, 96X96 mat screen

1 Link Video Network (twenty-one stations)
1 Logitech C7 Mouse
Appropriate switch boxes, cables, marker boards, overhead projector, and screen
All of the above equipment is secured to tables with spot anchors.
A dedicated and regulated power supply with surge protection is installed for both labs.

Software:

15 DOS 3.2
15 *Watchdog Data Security Programs*
15 Irwin/Bin Tape Systems
15 *GW Basic*
20 *WordPerfect*

Effect of Program on Students and Faculty

The 1988 summer session marked the fifth consecutive semester of computer lab use within the basic writing program. The program runs more smoothly with each semester and has shown a steady increase in the use of the facility, especially for writing and revising papers. Informal discussions with students for the specific purpose of determining what they think of the program have helped us correct weaknesses and maintain strengths; such discussions have also convinced us that students in general approve of the program and see it as a way of making the writing process interesting and less time consuming. Some students also believe that using the computer to write and revise has improved the quality of their writing. Formal student evaluations in the data processing course indicate a positive attitude. It is also interesting--and gratifying--to note that many students express openly their appreciation to the College for encouraging and helping them to use the computers. Faculty have willingly attended faculty computer workshops, have endorsed the use of the detailed computer labs, have praised the word processing instructors and lab assistants and, perhaps most telling, have begun to increase their role in conducting orientation classes.

Importance

Our sense is that everyone associated with this project--students, faculty, administration and staff--appreciates the importance of the word processing/ writing program.

First, we believe that by using microcomputers the writing program can focus more purposefully on the transfer of *knowledge* about language, mechanics, style and the composing process to the actual *application* of that knowledge to produce better writing. The advantages, most of which are true of word processing in general, are many:

- Correcting is faster and "cleaner" than when done by hand.

- Errors and weaknesses in syntax, sentence logic and sentence emphasis are easier to visualize on the screen.
- Spellcheck reduces the kind of anxiety that blocks writing for many students.
- Students can try more possibilities, create more versions and can be encouraged to review and revise repeatedly.
- Revision assignments can be tailored to fit individual students.
- Students learn a valuable computer skill.
- The printout is easier to read for student and instructor.
- "Lost copies" are prevented because students have a backup copy on their disks.
- Students remember the details of their revisions; they are more aware of what they did and why they did it.
- Students invest more time in revision and come to care more about cleaning up and styling their work during the final phase of process writing instruction.

Also, by introducing as many students as possible, as early as possible, to the workings of a sophisticated microcomputer word processing system two advantages are gained: (1) a majority of students become familiar with the lab equipment and procedures, making it easier for instructors in different areas to use the lab to enhance their course offerings (or simply to require that papers be word-processed; and (2) the majority of our students are assured of acquiring at minimum the personal and career benefits that come from being familiar with microcomputer word processing.

Summary

Begun in the spring of 1987, the computer lab component of the basic writing program at Mitchell has continued through five semesters. The program is still evolving, undergoing changes based on faculty and student feedback and experience in general.

While earnest determination is important, strong support from administration and faculty is essential. At Mitchell we were especially fortunate to receive the full endorsement and support of Dean David Harvey, President Robert C. Weller (retired August 1987) and President Bruce Swinburne. Further key ingredients for successfully integrating word processing within the freshman English curriculum include a carefully designed lab, committee selected software, close cooperation between academic computing and writing departments, flexibility (e.g., scheduling of classes), staff training (e.g., the use of faculty/staff workshops), structured written labs that may be used for reference, and *active ongoing communication*.

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MONMOUTH COLLEGE
WEST LONG BRANCH, NEW JERSEY

This computer enhanced writing program at a small private college offers courses in composition, from freshman level to advanced, in a networked lab equipped with AT&T computers, Panasonic printers, a Hewlett Packard laser jet printer, a large screen monitor, and a Kodak Datashow projector. WordPerfect word processing software (standard to all College labs) is supplemented by Choice Words, a dictionary and thesaurus; Grammatik III, a style checker, and discipline specific, faculty prepared instructional hypertext programs and databases to support writing across the curriculum.

History of the Program

Monmouth College received a grant from the New Jersey Department of Higher Education in September 1984, to incorporate strategies of microcomputer word processing into pilot sections of College English I. The program was a qualified success, i.e., feedback at the end of the term was largely favorable, but the two faculty who taught the pilot sections decided not to continue in the program beyond the grant year. One problem was the availability of only ten computers for twenty students, which necessitated a course design of alternating classroom/lab instruction. In addition, the faculty had only minimal experience with word processing and were unprepared to deal with hardware problems.

However, in September 1986, as part of the general education initiative to promote writing across the curriculum, the College hired a Director of Writing who had experience teaching computer-based composition. She received permission to limit initial class size in the computer lab to ten students; then, in fall 1987, the College purchased ten additional computers and peripherals to allow for twenty students per class. In September 1985, we received funding from the New Jersey Department of Higher Education to network this lab. The computer lab is currently shared with the Department of Continuing Education, but the College plans to expand computer facilities in the near future in response to the success of computer-based courses across the curriculum. The English Department thus anticipates a future computer writing lab consistent with our increasing enrollments.

Goals of the Monmouth College Writing Program

The freshman composition requirement for all matriculated students is one semester of College English I (Expository Writing) and one semester of College English II (Researched Argument); English 151 H is an honors section that combines both courses in one semester. However, approximately thirty-five percent of our students are initially placed into English 050, Fundamentals of English, to prepare them for college-level discourse. In addition, all students matriculated after July 1, 1988 must take a writing proficiency examination after satisfaction of the core composition requirement. Upper-level courses across the curriculum will require that students have passed the writing proficiency examination and command critical skills necessary to think and write about the texts and ideas of a particular discipline.

Our goal for the freshman composition program is to provide a student-oriented, interactive environment where students become engaged in the collaborative process of writing, thereby becoming prepared for upper-level academic discourse. By the end of English 102, students should be able to:

- address diverse audiences and purposes;
- employ a variety of rhetorical patterns of development;
- critically analyze texts to draw inferences, make judgments and synthesize information;
- use appropriate methods of inquiry and documentation to write research-supported arguments;
- compose in accurate and appropriate language, correct grammar and sophisticated syntax.

How does writing on the computer help students achieve these goals? For one thing, the noise and movement which are part of every computer lab invite informality and public debate, thus socializing the writing process. Second, the computer screen is a window into the consciousness of individual writers, and their thinking and writing processes become more accessible to both peers and the instructor as well as the writers themselves. Thus, writers can get help as a paper takes shape rather than receiving a list of errors on a final draft. Third, because text written on the computer screen resembles a printed page, it can be objectified by the writer in a way that handwriting cannot; therefore, the writer perceives the piece of writing, even in process, as something outside of the self. Writers can thus more easily understand the words they have composed as they might be interpreted by someone else. Fourth, composing on the computer supports the non-linear, recursive nature of writing; students freewrite, then easily move the cursor through their prose in all directions to clarify, reinforce, change or delete information and ideas. Pencil and paper plans must be copied tediously in order to sufficiently reshape them. Finally, interaction between the writer and the machine forces the writer to pay attention to making meaning, while hand-written prose often becomes obscured within unreadable scribbles.

These are only some of the pluses computer-based writing affords both developing and skilled writers. The main point is that unlike a traditional classroom, the computer writing lab evolves quickly and effortlessly into a writers' workshop. The students do more writing in the computer lab and more voluntary sharing of their own works in progress as well as critical evaluations of others' writing. And more writing, research tells us, can translate into improved writing skills.

Current and Future Computer Enhanced Composition Courses

Prior to Fall 1988, three sections of EN 050 (Fundamentals of Writing) and two section of EN 101 (College English I) had been taught in the computer lab. In addition, comparable hardware and software were installed in the College Skills Center, where tutors assist writers across the curriculum. Comparison of pre- and post-tests of students in the pilot sections indicated that computer-enhanced instruction had been beneficial. In addition, student evaluations at the end of the term were largely favorable (eight out of fourteen EN 101 students chose to repeat computer-enhanced instruction following their computer lab experience in EN 050 the previous semester). Nevertheless, we cannot state with any certainty that computer-enhanced instruction results in improved writing based on these informal assessments.

However, whether computer instruction does or does not improve students' writing is our primary focus for the 1988-89 academic year. Three English faculty are offering computer-enhanced sections of EN 050 for College Discovery students. College Discovery is a one-year program for selected students who do not meet regular admission requirements but who appear to be capable of success in college. Through a combination of credit load limitation, careful advising and individual help with basic skills, we are providing these students with opportunities to attain success at the college level. Upon satisfactory completion of the first year of study, College Discovery students are eligible to apply for acceptance into department majors or remain in undeclared majors.

Monmouth College has received funding from the New Jersey Department of Higher Education to restructure the College Discovery freshman year. Computer-enhanced writing instruction will be an integral part of this retention effort. A separate grant has allowed us to network the Computer Writing Lab. Pre- and post-tests of students in traditional sections of EN 050 will be compared with those of students who receive computer instruction. In addition, both formative and summative evaluations will be obtained on course design, instructional materials and student interaction with the technology.

We intend to increase the number and kinds of courses we teach in the computer lab as well as the number of faculty involved. Once we have connected the writing lab network to the College mainframe, and can share existing databases prepared by other disciplines, we will offer sections of English 102 (Research Argument) in the lab. Writing for the Workplace, Technical Writing and Advanced Composition will also become "full-time" rather than occasional computer lab courses. However, in order to provide ample open hours for students to complete assignments independently at the same time that we are expanding the number of classes taught in the lab, we will need to equip a second lab. None of this will happen overnight, but we will remain committed to the gradual expansion of computer-based writing instruction.

Course Design

In the composition sections currently taught full-time in the computer lab, students can choose to use the computers during some part of every class meeting. For example, in freshman composition, students may use computers to respond to reading assignments, which are first discussed in class and then written about, whether in personal expression or textual analysis. Of course, the reading and writing processes become more sophisticated and complex as students advance from EN 050 to EN 102, and the computer supports this increasing complexity. In 102, some students may take discussion notes on the computer and then shape them into a first draft of a written response. Or, students may be asked to freewrite or summarize at the end of a discussion in response to a specific question. Because the process of shaping what has been discussed informally is facilitated by the computer's ability to move and reformat text, the computer serves as an effective bridge between the students' spoken and written discourse.

Some students have their own word processors, either a PC or a typewriter with memory. Although I ask them to use our equipment during class, I do not object to their handing in assignments which have been typed at home. It is necessary, however, that they learn to use our computers and software because we often write short pieces during class, which are shared on a projector or revised by students working in pairs or small groups. We discourage grammar exercises that full-in-the-blank or offer multiple choices. Instead, we demonstrate and talk about a grammar principle, ask students to write a brief passage that will entail correct use of the principle, and then require that students proofread each other's on-screen work for only that one grammar principle. A final discussion summarizes how the error at hand can creep into one's writing and what writers can do to avoid it. This approach to grammar instruction can be successful in a traditional classroom as well; however, word processing makes the exercise easier to read, share and revise.

Hardware and Software

The computer writing lab is equipped with twenty AT&T 6300 computers, some with hard disks, the newer acquisitions with hard cards. The instructor's machine is an AT&T 6312 with a color monitor. We have nine Epson printers and a Hewlett Packard laser jet printer. A Kodak Datashow projector is available for instructional purposes. A Starlan network was installed in September 1988 using an AT&T 6386 file server.

Easy wordprocessing has been installed on hard disk and we have also installed *Easy* on some computers in the general computer lab, the College Center, and the College Skills Center. *WordStar* is also available in the general computer lab for students who require more sophisticated word processing (*Easy* is a Micropro product and thus "easily" converted into *WordStar* and *WordStar 2000*). Software for writers available in the computer library includes style analyzers, self-paced grammar review, outlining software, and interactive reading software. *Writing is*

Thinking, software to plan and outline a piece of writing, is available on some of the computers in the writing lab.

In addition, we will purchase the *Guide Hypertext System* so that instructors will be able to create instructional materials in immediate response to students' needs. *Guide* offers an interactive authoring environment accessible by non-programmers. It provides a rich "three-dimensional" interactive texture of text and graphics for educational materials. For example, students can click on a button to see a pop-up definition or explanation of a term. The possibilities are exciting and I am sure that we have not even imagined all the ways that *Hypertext* can help writers to improve their composition skills.

Effects of Computer-Enhanced Instruction on Faculty and Students: Pedagogical Implications

There are only two full-time composition faculty in the English Department and both are active in the computer-enhanced instruction program. Other full-time English faculty teach sections of freshman composition, but their main interests are literary. Quite a few use computers in their own scholarly pursuits and do bring their writing classes to the computer center for software demonstrations. Also, we recruit at least one instructor each semester from new full-time and part-time faculty to teach a computer-enhanced section of freshman composition, and thus insure the vitality and longevity of the program. In addition, more and more faculty in diverse disciplines are participating in writing-across-the-curriculum workshops and as a result are expanding their use of the computer labs and incorporating computer-enhanced writing strategies into their own courses. There hasn't been a mass leap onto the computer technology bandwagon at Monmouth, but sufficient numbers of faculty do remain interested in how computers can effectively support traditional pedagogy, and they are willing to expose their students to challenging possibilities.

Student attitudes towards computer-based writing instruction have been mostly positive. As the newness of our program fades, student expectations become more realistic. In effect, they are advised what to expect by older students who have participated in the program. We have a computer literacy requirement at Monmouth, and most students have been exposed to computers during high school, so there is much less anxiety about writing in the computer lab than we found only two or three years ago. About one-third of our students embrace computer writing enthusiastically and proficiently; one or two students are resistant and usually hand in their out-of-class assignments poorly typed or handwritten with the excuse that "the lab was full when I got here" or "my car broke down on the way" and so forth. The majority use the computers to advantage but some indicate on end-of-semester evaluations that they are unsure if they'll use the lab to work on papers for other courses once they've satisfied the composition requirement. However, one of our goals is to convince instructors in other disciplines to require continued use of word processing. In addition, now that we have a good base of students who have taken computer-enhanced writing courses, a follow-up study will provide feedback on how these writers continue to use computer writing strategies beyond word processing (for example, for planning or editing).

Weaknesses with our course design and instruction methods usually occur because the technology changes so fast that we are always using new and unfamiliar equipment or techniques. I have never started the semester in the computer lab without major additions or changes to master in addition to the new group of students. It makes teaching less comfortable, perhaps, but so much more challenging and, yes, fun. We remain convinced that computer-enhanced writing instruction does help improve student writing and that ongoing research will provide us with proof.

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NOVA COLLEGE
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This program at a small private liberal arts college offers freshman composition in a PC-based environment connected to a VAX PDP 11-780 running Berkeley 4.2 UNIX. Students use *Microsoft Works* *for word processing and connection to the mainframe, where they use* *Writer's Workbench* *to gain insight into their writing. Nova's Electronic Classroom offers an alternative to the traditionally structured and scheduled writing course.*

Nova University has long been committed to integrating technology into all phases of education, particularly pedagogy and course delivery. For the past three years, Nova University's graduate education programs in the Center for Computer-Based Learning have offered degree-seeking librarians, corporate trainers, and elementary and secondary educators the opportunity to develop their professional competence in an online environment. Using a combination of students' personal microcomputers, the TYMNET telephone system, and an on-campus VAX minicomputer with the UNIX operating system, students from many American states, as well as Canada, Korea, Taiwan, West Germany, the Bahamas, and elsewhere have completed graduate degrees.

Using UNIX tools on the mainframe, students complete their assignments and send them through their microcomputer over the telephone lines. Instructors log into their computers, and, using Nova-developed information management and instructional software, read and grade assignments, send replies to students, and hold online classes. Every few months, teachers and students meet at a common location for in-person interaction.

Three years ago, students in the Nova College undergraduate composition program began using computers to improve their writing (the freshman population was about eighty in 1987, and about two hundred eighty in 1988-89). Trained on a simple word processor, students turn their computer disks containing their writing assignments in to a computer lab assistant, who sends their work to the mainframe computer for *Writer's Workbench* analysis. The lab assistant then downloads the output and returns it to the students. Using this analytical output, students then revise and improve their papers. Having used the computer's tools to polish their written work, the students turn in their work to their teacher.

This fall, working in cooperation with the state of Florida, Nova College is developing an innovative, three-year undergraduate program, called the Liberal Studies Program. A central component of this program will be a competency-based, online student environment to develop communications and mathematics skills, based on the experience we've had in both the graduate and undergraduate programs.

Students will first attend the computer lab, outfitted with fifteen IBM-compatible, 80286 machines connected to the Nova mainframe through an Ethernet. For the first three to five weeks of the communications sequence, they will be taught to use a word processor; to upload and download files on the UNIX system; to access and use *Writer's Workbench* on the UNIX operating system; to use electronic mail; to use Electronic Teacher/Student (ET/ES), Nova's online information management tool; and to participate in the Electronic Classroom (ECR), Nova's real-time, fully interactive classroom simulation. Thereafter, all written work at Nova College will be done on a word processor, run through *Writer's Workbench*, and where appropriate, electronically mailed to the teacher, using ES. Teachers using online analytical tools, will respond, using ET.

Each student will have a communications manual outlining the competency-based requirements for the program. When the student is ready, he can begin sending assignments to the teacher. When a student electronically mails a paper to a teacher, the teacher can then evaluate the student's work and make the next assignment. Thus, 1) students will know, going into the course, what will be required of them to exit the course, 2) students can proceed at their own pace, and 3) teachers will not be beleaguered by periodic piles of papers.

Given this structure, classes will not be held the customary two or three times a week, but will be held as needed to discuss problems common to all student work. The teacher will act as one responding to individual writing problems. Instead of a semester-long series of lectures and classroom activities, when the teacher finds several students exhibiting the same writing problem, using electronic mail the teacher can then schedule a class with just those students. Hence, a "class" will not consist of students in compartmentalized units of fifteen or twenty. Instead, each teacher will have a teaching load of approximately sixty students. As each writing problem arises, those students with specific problems will meet with the teacher in a classroom. Each meeting, then, may well consist of a different configuration of students. Hence, the goal of integrating computers into instruction is not to reduce the normal contact hours between student and teacher, but to modify that contact time so that teachers meet with students individually and in small groups rather than in previously scheduled classes.

In addition, the teacher can be available periodically on the Electronic Classroom (ECR), in a computer version of a "homework hotline." The teacher can prepare online files for recurrent problems, and these files can be "read" into the ECR session for the students to see, or to be read into replies to specific student papers, greatly reducing the pre-computer effort of repeating the same instructional comments in writing over and over again at the end of handwritten student papers.

Based on a hierarchy of skills: narration, description, summary, exposition, argument, and research, students will write papers targeted at identifying and developing those skills. Each of these types of writing has been identified as a level of writing competence. Students will write a minimum of two five-hundred-word papers at each of these levels of competence, using, where appropriate, the reading from; other courses as the source for the composition. Having completed two successful essays, a student will receive permission to write a third essay in that competency area, the competence essay. Following completion of the essay, two other faculty members will evaluate it. If they deem the essay does satisfy competency standards, the student can proceed to the next competency level. If the essay does not satisfy those standards, the areas of deficiency will be identified, and the student and the teacher will work to rectify those areas of deficiency. Hence, students will not "fail," but will simply be given another opportunity to become proficient.

Administrators and teachers can use several mainframe programs to track students through the program. Since class time won't be a measure of students' attentiveness to the subject, we have argued that the online environment provides another space, in addition to classroom, dorm, library, and student union space in which students and teachers can interact.

While no instructional method is completely successful, anecdotal evidence (student evaluations, composition teacher responses, etc.) suggests that integrating computers into composition teaching has created new possibilities for instruction. With respect to students, our impression is that using computers as a tool does not improve students' writing more than traditional methods. However, it greatly improves the psychological dimension of instruction and of the student's attitude toward their work. Students seem to spend more time on their work, particularly on revision.

Rather than identifying writing problems, computer analysis identifies *potential* problems areas. Since computer output is by definition analysis, not evaluation, students must interpret the analysis, an extra step that requires the student to focus on his work. The student must go through the essay and determine whether the seeming error or problem is actual or not. Consequently, computer analysis provides the added psychological benefit of implicity compelling the student to concentrate more on writing.

Specifically, the *Writer's Workbench* output is useful to students, teachers, and administrators. It allows students to eliminate low level errors in their work before it is handed in, enabling the teacher to concentrate on more sophisticated aspects of the students essays. Also, the teacher can look at the statistical analysis of the essay (and indeed, using simple macros, an entire class) before beginning the evaluation process. In addition, the output makes essay grading less subject to the charge of being impressionistic. If, for example, the essay is far short of the required length, or it contains too many instances of the passive voice, *Writer's Workbench* indicates this clearly to both student and teacher.

In addition, the mainframe information management tools permit a variety of information about any student or class instantly available. This information can be easily manipulated to produce statistical data on student progress, faculty effectiveness, economic impact, and other useful statistics heretofore unobtainable.

The most important impact of computers on composition does not involve specific computer applications to a specific area of the composition process. Instead, the online environment requires both administration and faculty to rethink the traditional configuration of students, faculty, and administration. First, an electronic composition program pulls together several previously separated activities. What is now called information management formerly consisted of a heterogeneous and disorganized array of teachers saving student files (grades, progress reports, exams) in file cabinets. Evaluative comments on student progress were committed to the end of student papers, which students generally threw away. With the exception of the final grade in a course, after a course's end there was no way to trace a student's progress during the course. Second, student interaction with faculty consisted of classtime and office hours, with the occasional chance meeting on campus. If students wanted to know their status in a course, or where their paper was in the grading process, they asked their teacher, who may or may not have all the necessary records to produce a response. Third, when administrators wanted to respond to parental questions about their child's progress, the administrator had to locate the faculty member for an anecdotal report, or look up a final grade for a course. When administrators wanted to evaluate faculty, they had the touchy task of peer evaluation, student evaluation, and class visitation as grounds for their evaluation.

The electronic composition program has combined all these activities, and over time will redefine them. The computer can contain *all* information about a student in a course: all the papers can be accessed, as well as all teacher comments and grades on those papers. In addition, by treating the analytical output of programs such as *Writer's Workbench* as a database, various search techniques can produce an array of previously unavailable statistical information that can trace student progress.

The computer creates new possibilities for relations between students and faculty. Students are freer to work at their own pace. The ET/ES system allows Nova students to find out where their paper is in the electronic "stack" of papers in the teacher's electronic "folder." In conference, students and teachers can together review all the evaluative comments on all papers without physically searching for them. The online environment itself provides an additional space within which faculty and students can interact. The computer also creates new ways for administrators to find information about students and faculty. An administrator can have instant access to a student's papers, and using simple "tracking" programs, counselors can see how students are progressing in their coursework, without waiting for grades or student progress reports from faculty. Since the ET/ES system keeps records of how quickly and well faculty respond to students, administrators will be in a position to discover how promptly, and just how faculty respond to students.

"Humanistic" critics of integrating computers into academia see computers as a tool that will hasten the arrival of a brave new world, with the ultimate effect of a completion erosion of human privacy. The vast powers of information gathering, the regulation of otherwise heterogeneous ways of doing things, and in general, the threat of increasing uniformity have caused many to see the computer as a foe, not a friend to the ongoing quest to develop our humanity and transmit what we've learned across generations.

Let us not forget, however, that moveable type opened a new era of information storage, retrieval, and transfer; it regularized ways of producing information, and made public much of what was previously private. The result was nothing less than the secular and religious democratization of Europe. The arrival of the computer is clearly as momentous as the development of moveable type, but it seems to carry with it more possibilities for wrongful application. If this is indeed the case, educators must themselves assure that computers are integrated properly into their institutional settings. Gutenberg's most vociferous critics were secular and religious autocrats whose institutional power his innovation threatened. Like him, let's make sure these devices advance human freedom, rather than threaten it.

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OCEAN COUNTY COLLEGE
TOMS RIVER, NEW JERSEY

Ocean County College, a public community college, integrates weekly one-hour instructional sessions in text processing in all sections of Basic Composition, a four-credit developmental writing course enrolling more than 900 students annually. The sessions guide students to see ways in which text processing can facilitate and improve composing, editing, and revising. The computer writing lab is equipped with twenty-four AT&T 6300 microprocessors, twelve Star NX-10 printers, an Okidata high-speed print station, and a Telex Magnabyte Liquid Crystal Display Viewer for projection of monitor text onto a large screen. Our word processing system is WordPerfect 4.2, with built in spelling checker, thesaurus, and split screen features. Other software programs available are Writer's Helper II, Grammatik, selected portions of Intellectual Software's Practical English Series, GrammarLab, and Type.

History of the Program

The unique benefits of computer-assisted writing instruction have been amply demonstrated in recent years. An innovative writing curriculum incorporating the word processor's distinctive revision and editing features into a pedagogically sound sequence of writing activities can teach students to revise and edit text more enthusiastically and productively.

In the spring of 1987, Ocean County College conducted a pilot project* incorporating word processing and computer-assisted instruction into the curriculum of English 121, Basic Composition, a developmental writing course required for the two-year degree. The laboratory used for the pilot project was equipped with twenty-one limited-function Apple II+ computers, reconditioned castoffs from the campus technical program. However obsolete, these machines provided a temporary means of initiating the computer writing program.

In July 1987, the project directors were awarded a Computers in Curricula grant by the New Jersey Department of Higher Education. This grant enabled Ocean County College to replace the Apple II+ computers with twenty-four AT&T 6300 microprocessors, four additional Star NX printers (for a total of fourteen), a modem, a high-speed printer, and a transparency viewer for projecting computer text on a wall screen.

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* Funded by a New Jersey Department of Higher Education "Computers in Curricula" Grant (1987-1988).

While one or two faculty members were initially reluctant to use computer-integrated instruction for their Basic Composition classes, training workshops conducted by the projector directors minimized this problem. So did the preparation of simplified command sheets and preliminary exercise sheets for training students in the use of *WordPerfect* software. The most important factor in overcoming faculty concern about computer use was that each class assigned to the computer writing lab had a student lab assistant to provide technical assistance for faculty and students; lab assistants were also available during open lab hours.

Almost six hundred students enrolled in twenty-nine sections of Basis Composition have used the computer writing laboratory during the 1987-88 academic year. For the most part, they have responded enthusiastically to composing, editing and revising with a word processor. In fact, their criticism has centered primarily on lack of adequate time in the lab because only one-fourth of class time is actually spent in the computer writing lab. A few students who lack keyboard skills have experienced difficulty because of their inability to type; however, these students are encouraged to use the typing tutor program during open lab time.

Our Computer Writing Course and Our General Approach to Writing

Process: At Ocean County College, members of the English faculty believe that effective writing instruction begins with the premise that writing is a creative process. Thus, instruction focuses on the demonstration of prewriting, composing, revising, and editing strategies as flexible tools to increase students' ability to communicate clearly, forcefully, and authentically. Our computer writing program, which encourages creative instructional use of the textual fluidity offered by word processing, of the increased legibility of emergent text on the computer screen, and of the relative ease with which single or multiple printouts of any stage of a writing may be produced, not only serves to support the theoretical bases of process instruction but also to expand pedagogical options. In the course of a semester of lab instruction, instructors draw from these options to strengthen students' ability to work through all stages of the writing process.

For example, some instructors regularly devote several lab periods to prewriting activities, ranging from unstructured freewriting (a portion of which may be done as "invisible" writing); to imaginative assignments, such as having students freewrite as their favorite celebrity; to more structured prewriting activities, such as brainstorming lists of arguments supporting a position. Students report that these prewriting activities seem more "natural" and useful when accomplished on the computer screen since, eventually, portions of text produced as part of the prewriting process can be incorporated into writing drafts without tedious recopying.

On-screen composing proceeds through creating and developing outlines to drafting from previously brainstormed lists or notes about a topic. Some instructors concentrate heavily on the composing phase of the writing process in computer lab sessions, guiding students in their efforts to compose at the keyboard, demonstrating strategies for using both hard and soft copy as components of the composing process, and creating composing templates for students to use as models.

Although revising and editing activities can assume varied forms in the computer writing lab, our instructors uniformly assign a high priority to teaching these aspects of the writing process. Some use a majority of lab sessions to demonstrate revising and editing procedures; their students revise and edit both on screen and on hard copy, practicing strategies to improve content, organization, and style. Others incorporate revising and editing activities into a more comprehensive lab curriculum. Whatever the particular lab assignment, all instructors devote substantial portions of lab time to informal conferencing with students at the computer screen about ways to effectively revise and edit text.

In summary, using the word processor as a tool for writing instruction greatly facilitates instructors' ability to teach writing as a process. In a recent analysis of the computer lab program, participating faculty stated that the textual fluidity of word processing creates these instructional opportunities: the opportunity to expect more content development and more thorough revision/editing from students; the opportunity for substantially more one-on-one conferencing with students (most of this interaction occurring informally as instructors circulate during lab periods and view students in the actual process of composing or revising); and the opportunity for more purposeful group instruction (with a liquid crystal display viewer permitting transmission of text manipulation to the entire class by projecting the contents of one monitor onto a large mounted screen).

Collaboration: Collaborative learning activities, long valued by our writing faculty, are likewise facilitated by using computers for writing instruction. Several faculty members regularly pair students for interactive revising and editing, making such collaborative instructional activities the cornerstone of the semester's lab program. Others use occasional collaborative prewriting, composing, revising, or editing activities. In general, instructors report that writing on computers increases student collaboration, even without specific activities designed to promote interaction. Spontaneous student collaboration in the computer lab occurs naturally for three reasons. First, the new educational experience of computer writing causes students to experience a certain measure of initial disorientation, which quickly gives way to exhilaration. In either instance, students seek each other's support and approval. Secondly, as students compose, revise, and edit on computer screens, their writing assumes a public character, no longer intimately connected to their bodies by the physical act of penstrokes or sheltered from an observer's gaze by the protective position of the writer's body over the handwritten page and the relative illegibility of handwritten text. Finally, as the instructor moves freely about the computer classroom, reacting to evolving text and offering advice to students as they are engaged in the very act of creating meaning, writing begins to lose the mystique it has enjoyed as a solitary, inscrutable activity, becoming, instead, a social process inviting suggestion, discussion, reaction, argument, and brief periods of respite through conversational comic relief.

Rhetorical Models: In general, a rhetorical model approach to writing instruction governs the choice and sequence of writing assignments presented in the Basic Composition course. Most of the students who complete the course will enroll next in college-level writing course in which they will be expected to have a rudimentary knowledge of such common rhetorical forms as comparison/contrast, classification, definition, process, narration, and description. They will also need knowledge of rhetorical strategies to successfully complete writing projects for other college-level courses. Thus, work in the computer lab often is guided by a writing assignment worksheet, describing rhetorical particulars of the current writing project. Additionally, use of the split screen, writing templates, or the liquid crystal display viewer permits the computer to function as a facilitator of structural modeling in writing instruction.

Instructional Routines; Divisions of Time Between Computer Lab and Traditional Classroom

In the computer lab, students are primarily engaged in on-screen writing, revising, or editing, singly or in pairs. They are often guided by a set of directions prepared by the individual faculty member. These activities are class, instructor, and textbook specific, since instructors have discretion (within a general course outline) for designing the educational program for a given class. Often students have spent some of the previous class hour learning skills and procedures for that week's lab. Furthermore, labwork will usually be based on a preliminary assignment, i.e., notes or an outline, a rough draft (often with instructor commentary), or a journal entry.

At the beginning of the lab, there are oral directions to students, usually quite brief since students are eager to begin their writing project. While students are writing, the instructor moves about the room, taking the opportunity to conference with individuals and small groups. A lab assistant is always present, relieving the instructor of the responsibility for providing technical assistance. Students hand in all assignments done in lab, either as separate exercises or eventually as one stage of a finished writing assignment.

If the purpose of the day's lab period is to conduct a demonstration, the instructor will use a viewer and screen or load the contents of one disk onto several terminals for viewing by the class. (As soon as possible, we are hoping to set up a local-area network modeled on the ENFI system at Gallaudet University so that we can share emerging text quickly for lab demonstrations.)

To this point, none of our participating faculty have used the computer lab for isolated skills practice. Although we have purchased some skills practice software, these programs are used infrequently, primarily during open lab hours by individual students. The one skills-development activity that many instructors find profitable for group work, however, is sentence combining, which can be accomplished in several interesting formats using the editing capabilities of the word processor.

English 121 (Basic Composition) is a four-credit course, consisting of three traditional class hours and a lab period. Before the computer writing project began, the emphasis during the lab period was on skills practice. To many faculty, class and lab seemed separate entities, with different sets of materials, attendance records, grades, etc. Clearly, the class was the primary instructional setting; the lab functioned as a weak adjunct. With the introduction of a computer writing component, instructors have redefined the purpose of the lab. Most have concluded that they now consider class and lab fully integrated and that they use the weekly lab hour to add additional dimensions to the process of monitoring and guiding students as they write.

Students also are provided with fifteen to twenty monitored open lab hours weekly for extra practice, completion of lab assignments, or skills practice, using software programs such as the *Intellectual Software* series, *English Achievement* series, *Writer's Helper*, or *Type!* Additionally, lab assistants offer a series of workshops throughout the semester in various editing functions of *WordPerfect*.

Lab Hardware/Software

Hardware: Our lab hardware consists of twenty-four work stations of AT&T MS-DOS 6300 microcomputers with monochrome monitors, 640K memory, 20 megabyte hard disks, and single floppy disk drives. Advantages of this IBM-compatible system are that it is consistent with computers encountered by students in business and industry, it supports a powerful and versatile word processor (*WordPerfect*), and it permits permanent loading of programs onto its hard disk, eliminating the need to spend valuable lab time distributing, loading, collecting, and filing program floppy disks.

Routine printing needs are met by twelve Star Micrononics NX-10 dot matrix printers, offering ease of operation, good legibility of text, a choice of print sizes, and both draft and letter-quality results.

Special printing needs are met by an Okidata 393 fast-speed printer.

A Telex Magnabyte Electronic Imaging System projection pad with liquid crystal display, interfaces to the AT&T 6300 micro, and IR remote control device pairs with a standard overhead projector to display clearly and in greatly magnified form the contents of a microcomputer screen for full-class instructional demonstrations.

Our modem is the Mitsuba SuperModem, model SM2400.

Software: *Word Perfect*, the software that forms the basis of our instructional program in the lab, is a word processor that offers a range of functions for varied instructional needs: spelling checker, thesaurus, split screen, search and replace, clipboard, etc. These versatile editing functions are relatively easy to use, and the capability of creating macros to streamline them further makes this program especially suitable in curricula for developmental and learning disabled students.

There are several other software programs available in the lab. The most comprehensive is *Writer's Helper*, a several-stage, user-modifiable program that leads students through a variety of prewriting and organizational activities to a finished essay and then offers a stylistic analysis of the product. *Grammatik* is a text-editing and style-analysis tool that can call students' attention to certain writing errors and stylistic weaknesses. For isolated skills practice, we have purchased selected sections of the *Intellectual Software* language series and one of the *English Achievement Test* practice disks. Although these skills programs present certain weaknesses in construction, we have determined that we need to have them available for occasional use by individual students under instructor guidance. For assistance to students in strengthening their keyboarding skills, there is *Type!*, a lively program which offers individualized drills and immediate feedback on student progress in either a standard or game format.

Effect of Program

Evaluation of the project has focused on three areas: changes in student attitude toward writing; faculty assessment of the instructional mode; and collection and interpretation of statistical data measuring course retention and success rates before and after the institution of the program.

Student attitude surveys and faculty evaluation reports indicate that, thus far, the project has been very successful. Students who participated in the project have responded enthusiastically to computer-integrated writing. They have been especially enthusiastic about the following: (1) simplified insertion and deletion of text, reducing anxiety about composing, revising, and editing text; (2) simplified correction of spelling and typographical errors through use of the spellcheck function; (3) improved word choice through use of the thesaurus function; and (4) improved appearance of rough drafts and final drafts, with elimination of the tedium and frustration of handwriting. Faculty members report that they can no longer imagine teaching Basic Composition without the use of computers. Specific advantages of the project for faculty have included the following:

- Improved student motivation for composing, revising, and editing text; increased student involvement in the writing process.
- Increased use of collaborative writing and peer critiquing at computer terminals.
- Improved faculty-student conferencing through revision and editing at computer terminals.
- Enhanced development of curriculum materials based on the unique features of *WordPerfect* software (for example, revision exercises based on the use of the split screens function).

The project directors and the Director of Institutional Research are currently conducting a detailed, statistical study of the impact of computer-integrated writing on the Basic Composition course. Retention rates and success rates in Basic Composition before and after the initiation of the computer writing project are being analyzed.

Expanding Our Program

Our computer writing project currently involves approximately 600 students per year in English 121, Basic Composition, a developmental course leading to enrollment in the college-level writing course for transfer students or fulfilling graduation requirements in writing for two-year degree students. Students in the Basic Composition course receive one class hour weekly (out of four scheduled for the course) in the computer writing lab. As of Fall 1988, evening and summer sections of English 121 will also contain a computer lab component, raising the total number of Basic Composition students involved in this program to 850 annually.

We also conduct a two week orientation period at the beginning of each semester for English 151 (Introduction to Prose Writing) sections. Instructors of this college-level writing course bring their students to the lab for one or two orientation sessions, after which these students are encouraged to continue using the lab to prepare their writing assignments. Approximately 600 English 151 students annually are introduced to the lab in this way. Several English 151 instructors have requested more extensive use of the lab for their classes; thus we will be offering a unit of computer writing activities suitable for this course.

We also will be offering several sections of a remedial writing course (English 115-English Fundamentals) to the computer lab in a study to determine the value of word processing as a tool for basic writing students needs to increase their ability to support generalizations. As an outgrowth of this study, we anticipate developing several self-contained, coherent sets of computer instructional activities for basic writers.

Ocean County College, the only public postsecondary institution in Ocean County, accepts its responsibility to serve as a model for innovative postsecondary writing instruction. Curriculum materials and assessment results will be distributed to interested colleges throughout the state through mailings and through the Electronic Bulletin Board conducted by the New Jersey Center for the Study of Writing.

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THE OHIO STATE UNIVERSITY
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The Ohio State University is a large state-funded research institution located in Columbus, Ohio, with an Enrollment of over 40,000 undergraduate and graduate-students in its fifteen colleges and professional schools. Since its creation in the spring of 1987, OSU's Apple Project has introduced the word processing capabilities of the Macintosh computer into one-quarter of the English Department's Freshman Composition courses. All of our computer-enhanced writing classes are taught in an integrated environment in which the computers are situated along the walls of the classroom-labs, leaving the center area free for writing tables and the functioning of a writing workshop.

The English Department's computerized Apple Project is revising the way students write papers. As in all Freshman Composition courses at Ohio State, students discover that revision and drafting are vital parts of the writing process, but, through the use of Apple Macintosh computers in the classroom, they catch on to the idea of revision and drafting much more readily than do students restricted to pencils and paper.

Our Writing Program's general position is that students who produce multiple drafts of a paper tend to improve their writing skills. Since its inception, our computer-assisted writing program's primary objective has been to help students become more effective writers by exposing them to the writing process, which consists of planning, drafting, and revising. Because it is the only writing course required of all students at The Ohio State University, English 110 (Freshman Composition) is of crucial importance to our undergraduates, who need this course in order to improve their communication and learning skills.

Our classroom-labs allow our students to focus on the act of writing itself by producing multiple drafts for any paper. During scheduled class time and later during lab hours, computers provide students with abundant opportunities to work with language as a fluid medium. The revision capability of the computer invites students to take risks with their writing. Gone is the notion of the text carved in stone. Instead of laboring for hours over a hand-written text, students using computers are now revising entire blocks of their writing with the touch of a key. In such an environment, multiple drafting is no longer a tedious chore, but a challenging and productive process.

As one of our students noted on a final evaluation. "[With the computer] I am more willing to make major changes in my papers. I can be more free and imaginative with my writing, and don't have to be too careful with mistakes and other things when I have a good idea, because they can be changed so easily." Since the early 1980's, our department has been investigating the curricular possibilities of melding modern theory and practice in composition research with the latest developments in computer technology. In our basic writing courses, we have experimented with curricula which combine word processing and traditional classroom instruction. In 1985, we conducted a formal experiment in our regular freshman composition classes to measure the effectiveness of combining, in three regular composition classes that met five hours per week, three days of "hands-on" experience for students in a lab equipped with personal computers and two days of composition instruction in a regular classroom.

The results of these experiments were most encouraging. Pre- and post-test data from the Daly-Miller Test of Writing Apprehension indicated that the students' levels of apprehension were dramatically lowered at the end of the course. Numerous individual interviews and detailed case studies suggested very strongly that this unique blend of word processor and regular classroom instruction had done much to enhance the scribal confidence of most of the student participants. Students were enthusiastic about the program and remarked in particular how much the computer had encouraged them to produce multiple drafts and revisions of each of their writing assignments. This experiment not only convinced us that we should be incorporating computers onto our freshman composition classes; it also encouraged us to think creatively and innovatively about the direction further research in this area should take.

Although we were pleased with the results of the three-day-lab/two-day-regular-class approach in the original study, the students' enthusiasm for the computers led us to consider expanding the program to five hours of computer instruction per week, thus creating a pure computer-lab class and reducing traditional methods of writing instruction to an absolute minimum. One of the few complaints the students voiced during the earlier experiments was that they did not have adequate access to the computer lab before and after class and in the evenings. We decided, therefore, that any future experimentation would include a dramatic increase in the number of hours the lab was available. For a multiple-draft syllabus that heavily involves computers to be effective it is imperative that the students have constant access to the machines.

Our current program began in October of 1986, when University Provost Myles Brand and Professor Merv Muller, chair of OSU's Department of Computer and Information Science, informed the Department of English of Apple Computer, Inc.'s Higher Education Donation Program, a national competition seeking innovative proposals involving the use of computers in university settings. By November, fueled with enthusiasm, we created a proposal to use Macintosh computers on an experimental basis in English 110, our Freshman English Composition course. The Department's, College's, and University's support was energetic and overwhelming.

In early December, Provost Brand received word from Apple that the English Department had won the competition and would receive hardware and appropriate software worth more than $300,000. Apple's grant to Ohio State's English Department originally consisted of thirty-five Macintosh Pluses, forty Macintosh SE's, twenty Imagewriter II's, twelve Hard Disk 20's, five sets of 110 software packages, and miscellaneous support equipment. Since the end of 1986, Apple has added two Laserwriters, worth over $4,000 apiece.

During Winter Quarter of 1987, Frank O'Hare, Director of Writing, and I, with the help of two research assistants, pooled our knowledge about the learning and composing processes of students and developed a detailed syllabus for an English 110 "Apple class" that would be taught by teachers who had no previous experience with microcomputers in the writing class. The curriculum we designed at that time combined the strengths of the regular English 110 multiple-draft syllabus with the advantages of having Macintosh computers available to the students during all class meetings and at convenient out-of-class hours throughout the week. In addition to meeting almost daily to discuss successive drafts, we also developed detailed day-by-day descriptions of assignments and classroom activities that would take full advantage of microcomputers within the process-centered writing curriculum.

This team also had to develop, especially in designing the first half of the syllabus, a special classroom component that came to be called "Macstruction," detailed guidelines for teachers to enable them to introduce their students to the microcomputers as economically and efficiently as possible. Creating the "Macstruction" materials was especially difficult and crucial since the English 110 students would have to attain almost instant proficiency in the production and manipulation of their individual texts. The culmination of these efforts was the creation of our own *Macintosh Reference Guide*, a simplified version of the standard *MacWrite* documentation, to assist students in opening a new or existing document, saving work, inserting text, "cutting and pasting," copying a document onto a back-up disk, printing a document, and quitting *MacWrite*, all skills which our students must master within the first week and a half of the term. It is important to remember that this "Macstruction" had to be integrated into the framework of the regular English 110 syllabus designed to introduce students to the writing process: initial, working, and final drafts; freewriting, clustering, brainstorming; purpose, audience, experience, persona, and peer responding.

After the five instructors who would be teaching in the Apple classes during Spring Quarter 1987 were selected, the Apple Team created an intensive training program for them. The Team members met with the instructors, as a group and individually, to ensure that each new Apple teacher was expert in the operation of the Macintosh and the implementation of "Macstruction." The initial training sessions focused on the first few weeks of the course and the importance of establishing an efficient, yet encouraging, environment where freshman composition students would not be inhibited by the potentially threatening nature of the microcomputers themselves.

During the Spring and Summer Quarters of 1987, we began the formal implementation of our computer-assisted freshman writing program with five experimental sections of English 110 taught in a Macintosh-equipped classroom-lab renovated with funds from the Office of the Provost. The design of this classroom-lab was unique, enabling the teachers to retain the strengths of our modern "process-drafting" syllabus, while taking full advantage of the Macintosh computers. Unlike traditional computer writing labs, where the computers are spread evenly throughout the entire classroom area, dominating the rooms, ours had twenty Macintosh computers along the outside walls, one for each student in the class, freeing the large central area of the room for four student tables in order to facilitate full-class recitation, small-group discussions, and individual writing. Having the computers situated around the perimeter of the room emphasized their role within the operation of the class; the computers in this classroom-lab are available for the teacher to use as he or she sees fit, but at all times they are in the background, as tools, and never the substance of the class.

The success of these ten experimental sections encouraged us to expand our program for Autumn Quarter to sixteen sections, to be taught in a total of three classroom-labs, two of which were renovated during the summer of 1987. Written evaluations from both students and teachers and students responses on the objective Daly-Miller Test of Writing Apprehension indicated that students had grown in confidence during the course, that they were more proficient at drafting and revising their papers, and that their attitudes to writing had improved.

Our current computer-assisted writing program has solved many of the problems mentioned by students in our earlier studies: our classes meet five days per week in the lab; teacher lectures are reduced to a minimum as students actually write in the writing class; our students have access to two of our classroom labs (which are available six days per week outside of class time) and to various other Macintosh labs throughout the University. Students are able to use the classroom labs for homework during times not scheduled for classes. During these "homework hours," the lab is supervised by professional staff members from the University's Instruction and Research Computing Center.

During Winter, Spring, and Summer Quarters, 1988, we conducted the following experiment: We compared the results from the Daly-Miller Test of Writing Apprehension administered in our sections of computer-assisted English 110 to the results obtained on that same nationally-normed test administered in the same number of sections of our regular English 110 classes taught by instructors of comparable experience teaching students during the same quarter and at the same class time.

At the end of each quarter, all students in both the control and experimental groups completed identical teacher and course evaluations created by the Department of English; the results of these evaluations have proven interesting and encouraging. Many students praised the ease of writing on the computer, making such comments as, "The Macintosh Computer has made the writing process easier, more accurate, and somehow, more exciting. (And I didn't think that was possible)." and "[Writing] has become enjoyable for me. I think my writing has really improved. The chore of having to write it down on paper made it hard for me to expand my ideas. On computer it's so much easier. I think faster than I write--but not type." The ease of use may have facilitated more small- and large-scale revisions. As one student related: "[With the use of the computer] I tend to be more willing to make major structure changes in the paper because of being able to rearrange the paragraphs," and as another noted, "I love to use computers when I write. I am constantly changing and shifting sentences or paragraphs." And because students are able to revise so readily, many experienced a reduction in writing apprehension: "[My attitude toward writing has] increased over the quarter. Before I dreaded writing, now I love it. In high school I felt restricted and not allowed to create my writing. I found a new freedom in this class.... I will continue using word processors because with them you can concentrate more on the writing and less on the correcting."

Beginning in Autumn 1988, as we increase the number of computerized English 110 sections we offer from sixteen to twenty-five per term, we will augment our evaluative measures with short- and long-term case studies of actual student-writers as they compose within English 110 and beyond 110, across the undergraduate curriculum. These case studies will lend qualitative explanatory power to the quantitative data.

Future plans call for the use of computerized instruction in our upper-level undergraduate writing classes (specifically English 210--Intermediate Essay Writing, 301--Informative Writing, 302--Critical Writing, 303--Research and Term Paper Writing, 304--Business and Professional Writing, and 305--Technical Writing) as well as a number of literature classes throughout the College of Humanities. We are also experimenting with a variety of syllabi within our freshman Apple classes, for example varying the ratio of conferencing and lecturing in the class, experimenting with the numbers of papers assigned, and testing the efficiency of a number of team teaching configurations using a combination of classroom-labs.

Although we are at present using the computers as "stand-alones," we are excited by the future possibilities inherent in networking. Networking would allow us to use interactive instructional techniques and efficient file systems. Networking would also allow us to track student performance, monitor resource use, and facilitate student-teacher interaction. A sophisticated networking system would help students to edit one another's papers and teachers to respond to their students' work; it would also allow groups or classes to interact on the computer. Eventually, each teacher would be able to gain access both to a particular student's file and to a general paper file, with titles and subjects of every paper written for the course. The existence of the latter file would do much to alleviate the nagging problem of plagiarism.

Our current computer-assisted writing program has attracted attention at the state and national level. Apple, Inc. has named our program an official "Demonstration Site" for the integrating of computer technology and writing instruction. Other universities--including Florida State University, West Virginia University, the University of Tulsa, the University of Houston, the University of Pittsburgh, and the University of Cincinnati--have asked for our guidance in the design of their programs. We have also worked with West High School in Columbus, Ohio, in the development of their Apple Classroom of Tomorrow. Other school districts in Ohio, West Virginia, and New York are currently developing computer-assisted writing classes, drawing on our philosophical and physical model.

Students who successfully complete our computer-assisted freshman writing course have mastered the techniques of word processing and are skilled at managing the complex process of planning, drafting, and revising their work. Equally important, these students are confident when faced with a writing task in any class across the undergraduate curriculum and beyond. As one of our students noted, "I love to write now--the computer made me anxious for class, and anxious to write. I find it easier to express myself [now] than when I sit down and write and then type." Or as another writes, "The use of computers is fantastic. It has made boring old English into a more exciting class."

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PASSAIC COUNTY COMMUNITY COLLEGE
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Project Comp is a word processing lab for both ESL and developmental students at Passaic County Community College, a public two-year college offering A.A. and A.S. degrees. The lab is equipped with Apple IIe computers and Imagewriter I printers; switch boxes are used to connect the nine printers to the computers. Instructors have the option of using either AppleWorks or Bank Street Writer word processing programs.

Background

The Comp Lab began in 1985 when an ESL faculty member received a grant under Vocational Education funding. The grant allowed us to purchase twenty Apple IIe computers, nine Imagewriter I printers, and software (*AppleWorks* and *Bank Street Writer*) to hire personnel, and to modify existing space in the College to accommodate the lab. The rationale for the grant was that many of our community college students, ESL and non-ESL students alike, needed to improve their writing skills before they could enter our major programs. It was our feeling that word processing would help them develop these skills. Secondly, we knew that many of our students were interested in our majors related to computers. Finally we felt that our students could be encouraged to remain in school if they felt they were developing a skill that could help them continue at the College and a skill that would be needed in the job market. Our biggest problem at the beginning was getting the space modified to set up the lab. Until the room was ready, the computers were located in a regular classroom, which made it difficult to provide as much computer time to our students as we had planned.

For the first semester of the project we had only a few faculty using the computers as part of their courses. This may have been due in part to an unfamiliarity with the technology as well as the difficulty of scheduling. The students who used the word processors reacted with some hesitation at the beginning. In my classes I always allowed those students who did not want to use the computers to have that option. My experience, however, was that all my students, even those who were afraid, were eager to find out about these new machines. At this time we were using the word processors as glorified typewriters. Students came into class with handwritten copies that they then entered into the computers, but even at this stage they saw how easy it was to correct mistakes. As an instructor I found it helpful to be able to work with students at their screen to point out things and have students try to make their own revisions. Throughout this early period students were excited about using the word processors. For most of our students, college was their first exposure to this technology.

In addition to using the Comp Lab as part of an instructional activity, students were able to use the lab as an open lab. The grant provided funds for a lab coordinator and tutors. The lab coordinator, working with the project director, developed sets of materials to introduce the students to the computers and was present during the "open hours" to supervise the lab.

Our Approach

Most, if not all, of our writing instructors see writing as a process. This process involves discussion, prewriting, first draft, revisions, and final copy. The word processors support such an approach since revision and error correction are so easily accomplished. Instead of rewriting a complete paper, which students are reluctant to do, a file that has been saved can be reworked many times until the student is satisfied with what he or she has written. All of my students buy their own diskettes at the beginning of the course, and they save all their writing on these. The hard copy they give me is returned to them with my suggestions. These can include rhetorical advice as well as signals to them regarding grammar problems. I try not to correct grammar; instead, I use a symbol system. My experience is that students are more willing to make corrections and revisions on the word processors, probably because it is so much easier. In addition, throughout the course we emphasize that writing is a process involving rewriting and that word processors facilitate this process.

We have had about 150 students each semester use the Comp Lab as part of their writing course. The number has varied because instructors have the choice of using the computers. The writing courses have involved all levels of ESL as typically found at a community college. We have also had some developmental writing instructors use the Comp Lab, but this has been a smaller group.

Our writing classes meet twice a week for an hour and twenty minutes. The writing instructors who have decided to use the computers with their classes are scheduled into the lab one day a week. This seems to work well, allowing discussion about the topics and other non-writing activities to take place on one of the two days so that the time in the lab is spent on writing.

Lab activities can be varied. We may use the lab to write from a set of notes that were developed in the classroom meeting of that week. Students sometimes work in pairs to brainstorm and develop the thesis they will write about. As they tackle writing, students are encouraged to move around from screen to screen to share ideas and offer suggestions. This seems to be very helpful for a student who "can't think of anything to say" on a topic. While students write, the instructor can move among the students and screens and offer corrections or advice. Having the text on the screen makes it easier for both student and instructor.

Some instructors have developed exercises that they use on the word processors. These have included sentence combining, exercises in classification, punctuation exercises, and exercises on specific grammatical items.

The evidence of the program's effect on faculty is that each semester we have had more instructors asking to be scheduled into the Comp Lab. We have tried to determine what effect the lab has had on the students who use it, but I do not think we have hard evidence at present. We have tracked students who have used the lab to find out if they return to the College in the semester after they use the lab at any greater rate than students who have not used labs. We have also looked at the number of students who have taken computer courses after having worked in the Comp Lab. We will be examining these data and pursuing other approaches.

The goals of the Comp Lab have been to use the word processors to help students improve their writing skills, thus allowing them to enter into major programs at the College. We have felt that our students, who are mostly disadvantaged, needed to have exposure to the technology that they were not likely to have had before coming to Passaic County Community College. And since most of our students come to the College seeking quick training for jobs, we felt that the Comp Lab would encourage them to consider our major programs and careers in computer-related fields. It was our expectation that more of our students would be likely to complete their program at the College and not drop out as a result of the direction they received in the Comp Lab. As part of our grant, we worked with our Career Counseling office to provide speakers from industry to speak about careers in data processing.

My feeling is that most of the students who used the Comp Lab had a great sense of personal satisfaction that came from mastering a new machine they felt was very necessary for their future. I found some students extremely intimidated by the computers, and they probably did not get anything out of using them. In fact, I did not force such students to use the word processors, and since this was a very small number, I did not feel this represented any failure on our part.

I feel that word processors have much to offer as a way of developing better writers. Students seem to write more when they use the computers, and they also seem to be more willing to make corrections. Since revisions are so easy to make, I think students develop an understanding that writing can be changed, worked with, and honed until it is just the way they want it. Students seem to feel much more attached to a handwritten paper and less comfortable about changing anything on it.

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RANDOLPH-MACON WOMAN'S COLLEGE
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An introduction to Microsoft Word is part of Orientation Week for all new students at this small independent liberal arts college, and word processing is required in freshman composition courses and in the writing intensive interdisciplinary course, Freshman Colloquium. Forty IBM, AT&T, and Zenith personal computers are available for student use. Student writers have found that word processing fits beautifully with a long-established personal tutorial approach to the teaching of writing skills across the curriculum.

Because it is a small college (750 students, faculty/student ratio 1:10) dedicated to "education in the singular" and because it has unusual faculty commitment to and administrative support for the College-wide Writing Program, Randolph-Macon Woman's College has been able to introduce word processing across the curriculum in relatively short time. The first word processing instruction in writing courses took place in 1985-86 when a faculty member in the English Department began on her own initiative to teach *Microsoft Word* to her composition students. She produced her own handouts and brought the whole class (usually eight to twelve students) to the Learning Resources Center or the Computer Lab for one or two class meetings. Students were then required to use word processing for all drafts and revisions prepared for the course.

The advantages of word processing as a resource for student writers were so immediately obvious that several more instructors taught *Word* to their composition classes the next year, while upperclassmen lined up for word processing workshops offered by the Learning Resources Center. Now, since Fall 1987, all entering students are required to attend during the first week of classes, an introduction to word processing workshop organized by the Writing Program. New students attend these workshops with their orientation groups (seven to eight students), and they are then required to practice their new skills in all freshman writing courses. The expectation is, of course, that they will want to continue to use word processing in other courses and throughout all four years of college.

There is resistance at first from some students, especially from those who have never learned to type (new students receive a letter during the summer urging them to learn to type before they arrive). But most students are enthusiastic about learning a "real world" skill as soon as they get to college, and they quickly learn to be resourceful and to help each other develop coping skills in the inevitable computer room disasters. Also students have learned that sharing the community computers and software requires better time management by everyone; those who wait until the last minute to start papers may rush into the Computer

Lab and find every PC in use. Faculty response has been generally enthusiastic, although instructors had to develop new policies for a whole new generation of computer-age excuses for late papers. Faculty certainly appreciate the new standard of expected neatness, the ease of producing multiple revisions, and the benefits of the *Spell* program for students with serious spelling problems.

Unless they are granted exemption from the English composition degree requirement (on the basis of the entering record, usually Advanced Placement examination scores), all freshmen (about 225) take both a composition course in the fall term and Freshman Colloquium (an interdisciplinary writing intensive course taught in small sections by faculty from seven different departments) in the spring. Students who are exempt from the composition requirement are placed in the Colloquium for the fall term. Word processing is required in both courses. In the freshman composition classes individual faculty choose their own texts and design their own syllabi: some teach a conference-centered course on a contract basis, with or without a textbook; some use literary texts (anthologies, women's autobiography) as the basis for writing assignments; others teach expository writing through systematic presentation of rhetorical modes. Students in the composition courses may submit as many as twenty essays plus revisions in the fourteen-week term. Students in all Colloquium sections write and revise five short papers and a five to seven page library paper. At the intermediate and advanced levels, the English Department also offers elective courses in Academic Writing and a Prose Workshop.

There is no one authorized approach, theoretical or pedagogical, to the teaching of writing at the College, but the emphasis is certainly on process and collaborative learning in the small composition classes, in the senior seminars, and in the Writing Lab tutorials. The part played by the computer in all of these settings is left up to the instructor or the tutor and the students. So far there has been only limited experimental use of instructional, prewriting, or editing software on this campus. Instead, word processing has fit beautifully with a long-established personal tutorial approach to the teaching of writing across the curriculum. Since 1986 faculty in all departments have formally evaluated student writing skills at the end of every semester in every course where there is a basis for such judgment. In order to remain eligible for the degree, any student judged by two or more faculty members to have writing skills deficiencies must either pass a proficiency test or enroll in a composition course, a writing intensive section (offered in all departments), or a weekly tutorial in the Writing Lab in any semester following her low evaluations.

The College has more than thirty IBM and AT&T personal computers for student use, located in the Learning Resources Center, the Writing Lab, the Computer Lab, the Library, Martin Science Building, and in several other departmental work stations. Most of the computers have printers, and students may also use a library laser printer. Some computers are equipped with hard disks. Software available for student use includes: MS-DOS/GW BASIC; *Microsoft Word 4.0*, *Learning Word*, *Word Help*, *Thesaurus*, and *Spell*; *Typing Tutor*; *Reflex*; *Page Maker*; *Statgraphics*; Turbo Pascal; FORTRAN; TIPS for TARGA; and a variety of other discipline-specific programs. Faculty may reserve the LRC or the Computer Lab for class meetings; others prefer to use a projector in their own classrooms.

At the end of the semester, when all the senior seminar papers and all the Colloquium library papers are due at once, and lines are forming at every computer station, and the overworked equipment begins to do its own strange things, there are always some second thoughts about applying precious small college resources to such a project as teaching every student to write with computers. Most of the College's academic computing support comes from faculty volunteers, and providing and maintaining community software presents real challenges (damaged or disappearing disks and scrambled printer codes, for example). Nevertheless, the difficulties are surely balanced by the benefits when the Writing Lab is filled with economics majors writing or revising every week for peer evaluators in senior seminar, Writing Workshop students trying to get the computer to put their poetry on the right part of the page, the freshman thrilled to be liberated at last from her inability to find her own spelling errors. Perhaps the most important effects of the program are the most subtle, the most difficult to document. It is often the student who was always at a loss in front of a blank sheet of paper who turns out to be the computer-room problem-solver for her peers and who loses a lot of her writing anxiety in front of a screen. When the student who is very sure she is "not mechanical" has no choice but to go to the Computer Lab, she learns from other students that she can "do" computers after all. For most novices there is quiet pride and delight in new skills, then a growing sense of competence, and eventually a new willingness to try things, to experiment, to discover, to change things, to learn from each other, all impulses that can carry over into the writing process itself. In 1988 faculty and staff from every part of the College filled a week-long summer workshop on using personal computers, anxious to keep up with the students, enthusiastic about sharing their own experiences. For most of the community there is a strong sense of having a long way to go with this whole new process, but the first "draft" has been a very good one.

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RIO HONDO COMMUNITY COLLEGE
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Rio Hondo, an urban community college serving a diverse population of 15,000 students, offers computer assisted instruction in basic writing classes, freshman and advanced composition classes, mass communication classes, and ESL writing labs. We have a twenty-eight station composition classroom and a thirty-station writing workshop equipped with IBM compatible AT's. These machines have WordPerfect for word processing and Rightwriter for editing, installed on the hard disks. We have developed a manual to assist students in using these programs and also use a Kodak Datashow for instruction.

Background

In 1985 a small number of us wished to develop a computer-based writing program. When we heard of a software program being developed at UCLA called *WANDAH*, which broke the composition act into the three main areas of prewriting, writing, and revision, we decided the time had come to start our program. In 1986 we purchased twelve computers and software packages and piloted our program with basic composition students. Originally students used computers only in a lab situation for two hours a week, sharing equipment. After the first semester, we doubled our computers in the lab. In the following year we added two computer classrooms of thirty computers each. Now, more and more faculty and students want access to computer based classes, and we are looking forward to adding another computer classroom next year. Although the initial faculty reaction to using computers was mixed--some very much in favor, some adamantly against, and some apathetic--the number of faculty actually using them in teaching has continued to grow. Only about one-quarter of our faculty now teaching composition are using no computers at all. Student reaction to the use of computers has been overwhelmingly positive. Although an occasional student has problems (especially those who cannot type), most eagerly accept the challenge of attacking composition in a new way. Many of our students have previously failed at writing; the chance to compose on a machine and to see professional looking copy as a result is encouraging them.

Our Approach

The most important element that computers have given our teaching is the opportunity to concentrate on process rather than final product. In most classes without computers, students do their composing outside of class. Even though we may stress the importance of revision in these classes, most of the time students hand in only final drafts, which then receive comments and a grade. The students then progress to the next paper. Using computers, however, students are able to go through the steps in writing, from brainstorming, to developing thesis statement and points of development, to revising rough drafts. At each step along the way their teacher provides constant feedback, suggestions and encouragement. Rather than worrying about mechanics in the early stages of the writing process, students can concentrate on content at each level. Typically, students hand in a draft of work at the end of each class session. The teacher reads this draft, makes suggestions and comments, and returns the draft at the beginning of the next class session so students can continue writing and revising. If the teacher wishes, each of these steps can receive grades. By breaking down the composition process into easily recognized stages, students, regardless of their individual strengths and weaknesses, can proceed at their own pace and experience eventual success after revision. Another important effect we have observed about students writing in a computer classroom is that they become totally responsible for their own progress. They are busy all the time.

Our Courses and What Goes On

At Rio Hondo College we have two levels of basic composition classes, a lower level, English 52, and an intermediate level, English 50. We have approximately 164 students, per semester, taking these classes on the computer. All students enrolled in these classes must also take a one-unit lab class called Writing Workshop, which meets for two hours a week. We have a total of 768 students enrolled in Writing Workshop, all of whom have access to computers. In addition we have a freshman composition class, English 1A, an advanced composition class, English 1C, and a Grammar and Usage class. We have approximately 156 students taking these classes in computer classrooms. We also have a full range of intermediate levels, beginning with English 58A and 58B, and ending with English 59. All ESL students (approximately 275) must take a one-hour, non-credit lab, all of which are taught using computers. We also have various media courses using the computer such as Writing for the Media and Newspaper Writing and Reporting. These classes involve approximately 60 students.

The classes taught on computers meet only in a computer classroom. Each student has access to a computer and none is expected to share them except in the Writing Workshop, where about seventy-five percent of the time two students must share a computer. While all classes spend time in group activities and discussion of new concepts and ideas, students use most of the class time actually writing and revising compositions. Teachers move about the classroom, conferencing with students and serving as resource persons. We have discovered that students working on computers produce more work and feel a great sense of accomplishment. Some time must be spent in familiarizing students with the use of the computer, but after the first two weeks or so most are remarkably proficient. We have found that it is helpful to have student assistants, especially during the first two or three weeks until students become familiar with the programs and printers. Although some students find it difficult to compose at the processor initially, most become much more fluent with time, especially when they realize how easy it is to edit and revise. Another common problem for students learning to use the word processor is developing a light touch on the keyboard, but this is quickly mastered. All in all, students who have failed at writing in previous attempts usually find that using word processors makes the job of learning to write a new and untainted experience. We have found that it is possible to combine the teaching of computer functions with the teaching of composition concepts. For example, teaching students the block and move functions of *WordPerfect* can be combined with a lesson on paragraph unity, development and cohesion. Teaching the spell and search functions can be linked with a lesson on editing. Editing programs such as *Rightwriter* not only reinforce comments that the teacher has already made about long sentences, weak constructions, and passive voice, but also allow the students to begin correcting such problems before the teacher even sees them. This gives the students a greater sense of control over their writing.

Hardware and Software

We use IBM compatible computers with hard drives. We have IBM clones with and without turbos. Two things we have discovered in working with students is that the fewer disks the students have to handle the better. The hard drives make it possible for students to need only their personal floppy disks. We have also found that moderate speed is an asset, at least after students become used to working on the machines. Students who come into the class with any computer experience whatsoever appreciate the faster speed of the turbos. We are now using *WordPerfect* for word processing, *Rightwriter* for editing and revising, and *Scriptmaster* for media classes. We have prepared a manual for students to use which simplifies *WordPerfect* and teaches only the functions needed for composing and revision. We have also programmed several macros which simplify printing and formatting. Other macros we have designed allow students to do prewriting activities such as brainstorming and outlining.

Our Feelings About Our Program

The strongest evidence for our program's effect on students and faculty is the continuing and growing demand for classes of all kinds on the computers. Our program has had a revitalizing experience for faculty, offering them a new challenge both in their classroom activities and their own personal work. Students appreciate getting experience on word processors, which will make them more desirable in the job market. For students with spelling and handwriting problems, the computers offer the possibility of creating work in which they can take pride.

We feel that computers are here to stay. English departments that do not incorporate computers as an alternative to traditional English classes will find that they are denying their students and themselves many opportunities. Besides offering students enhanced job skills, computer writing courses offer a far more effective way to teach and learn writing.

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SKIDMORE COLLEGE
SARATOGA SPRINGS, NEW YORK

The Computer Supported Writing Classroom of the English Department at this small coeductional liberal arts college provides writing instruction through the use of word processors for both introductory expository writing classes and topical writing courses on the freshperson level. The Classroom is equipped with sixteen IBM PS/2 Model 30 computers using the WordPerfect 4.2 word processing program. In addition to its function as an instructional center within our required expository writing program, the Computer Supported Writing Classroom serves students and faculty as an evening computer lab for writing projects from across the college curriculum.

The English Department of Skidmore College established the Computer Supported Writing Room (CSWR) in the Fall of 1986 to supplement the College's expository writing program. The CSWR serves as a classroom reserved for the teaching of writing with word processors and as an evening computer writing laboratory for students and faculty. Only two years old, Skidmore's program of computers and composition is continuing to evolve and improve to meet the expanding needs of faculty and students.

Preparation for the CSWR began in the early 1980's. The conflation of two events initiated the planning for a program incorporating the use of word processing in introductory writing seminars. A visibly increasing number of students entered Skidmore with personal computers, and a significant number of English Department faculty began to comment on the positive effects word processing had on their own writing. The College had also previously received a grant from the Exxon Education Foundation to assess and investigate the expanding place for computers in our college curriculum. As a part of this grant, one member of the English Department undertook a survey of word processing systems and composition software while another researched existing computer programs at others colleges and universities, such as Michigan Technological University, Oakland University, and the University of Wisconsin, Madison. This research laid the foundation for the CSWR.

The English Department never intended to use computers for high-tech grammatical and stylistic drills. Rather, the Department's Computer Committee planned to introduce computers as an interactive method of writing and teaching composition. The committee's initial proposal called for the creation of a classroom with a network of eighteen computers, which would allow students to work collaboratively as well as permit instructors to intervene at any stage in a student's writing process, to comment on the student's work, and to direct students to additional instruction in heuristics, organization, and development. Two of the Department's rhetoricians attended Cindy Selfe's Summer 1986 Conference on Computers in Writing Intensive Classrooms at Michigan Technological University to learn how to select computer hardware and software for such a writing program and how to plan the physical layout of a computer classroom. Although Exxon turned down the English Department's separate grant proposal to fund the CSWR, this did not deter the Department's enthusiasm or commitment.

Despite the lack of outside funding, the Department was able to continue planning on a more modest scale. The College's Academic Computing Committee strongly endorsed the English Department's program. The English Department avoided budgetary protests because the College provided additional funds for the computer project; no budgets of existing programs were impinged upon. In addition, several members of the English Department, although not active in the teaching of composition, were knowledgeable advocates of computers and vocal proponents of the program. The CSWR gained further support because teaching writing with computers was to be voluntary.

Resources to equip the CSWR were limited. Fortunately, an unanticipated 1986 alumni donation provided the College with twenty-five Apple IIc computer packages. The English Department applied for and received use of twelve Apple IIc's, three printers, and *AppleWorks* word processing programs to begin its computers and composition program. Because only twelve computers were available for a course which enrolls fifteen students per section, classroom use of the computers was limited. The Apple IIc's provided basic word processing capabilities, but classroom instruction was often hampered by the poor quality of the Electrohome large-screen monitor. Compounded by the absence of a network or video switching system, the difficulties with the monitor constrained in-class group writing activities using computers. This also slowed group instruction on how to use the computers. Ironically, although limited in capacity and sophistication, the Apple IIc's proved immensely popular with students, many of whom had worked on IIc's in high school. The evening laboratory hours were very successful; approximately 350 people used the new CSWR facilities in its first year.

As a result of enthusiastic support from students and faculty, for the 1987-1988 academic year the English Department asked for and received college funding to replace the Apple IIc system in the CSWR with sixteen IBM PS/2 Model 30 computers, four printers, and *WordPerfect 4.2* word processing program. The change in hardware and software caused a small delay in the growth and popularity of the CSWR since students and faculty had to learn a new system consisting of IBM computers and *WordPerfect* word processing software. By spring semester, however, the CSWR recovered the popularity it had achieved the previous year. The CSWR now provides users with a sophisticated and comprehensive professional word processing system which fulfills the needs of both students and faculty.

The increasing popularity of computers among students and faculty revealed in testimonies in support of word processing provided the initial motivation for Skidmore's computers and composition program. More important pedagogical reasons provided the major educational impetus for the creation of such a program at Skidmore. Over the past decade and a half, Skidmore has considered itself among the vanguard of small liberal arts colleges in the teaching of composition. In cooperation with the New York College English Association, Skidmore sponsored "The Writer's Mind: Writing as a Mode of Thinking" conference in 1980, which culminated in an NCTE publication of the same name. Skidmore also received an NEH Pilot Grant funding part of its writing-across-the-curriculum program (from January 1982 to June 1983) including a faculty workshop in the summer of 1983. Revision is the primary aspect of the process approach to writing emphasized in Skidmore's composition classes. And workshop participants received this message. As the faculty accepted the importance of revision in student writing, the difficulties in getting students to engage actively in revision became more apparent. Pedagogically and technologically, word processing appeared to offer one solution. The ease that word processors afford for change and variation in writing encourages writers to see revision not as an obstacle, but as part of the play of language. Writing with a computer not only maintains the flexibility and accessibility of the text; it also provides greater mechanical ease for teaching and practicing strategies of revision.

The use of computers integrated naturally into Skidmore's writing program. In writing seminars computers are used not only to teach and encourage global revision, but also to introduce the finer elements of stylistic revision. The addition of word processors also enhanced another central aspect of introductory writing course: collaborative learning through peer critiquing. Following the models of Helen Schwartz and Kenneth Bruffee, peer critiquing with a word processor encourages students to devote more attention to each other's texts and to view their criticism more seriously and revision more eagerly.

Skidmore uses computers primarily in Writing Seminar I (EN 105), the main course fulfilling the College's writing requirement. Although Skidmore also offers a developmental writing skills course and a thematic approaches to writing course, these courses have yet to be offered as computer-intensive writing seminars in the CSWR. However, during the first year, seven of the twenty-one Writing Seminar I sections--approximately 105 out of 300 students--met in the CSWR. Four of the twenty-one sections of Writing Seminar I were held in the CSWR during the second year, reaching sixty students.

A diversity of approaches characterize Skidmore's computers and composition classes. One professor teaching in the CSWR follows the program for teaching composition with word processors presented in Helen Schwartz' *Interactive Writing: Composing with a Word Processor.** This class divides its three one-hour sessions between weekly small group conferences with the professor and classroom sessions devoted to writing activities on the computer, including peer critiquing. The other classes meeting in the CSWR follow the instructors' own syllabi, which incorporate word processing into the curriculum of the writing seminar.

In a typical computer-assisted writing course at Skidmore the students receive a basic introduction to the computers in the first class meeting. Early in the semester students learn heuristic techniques such as blind writing, freewriting, and collaborative freewriting on the computers. Students are fully introduced to the computers by the time they complete the second composition in the course; however, composing papers on the computers typically remains optional until the fourth essay.

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* Schwartz, Helen. *Interactive Writing: Composing with a Word Processor*. Holt, Rinehart & Winston: New York, 1985.

During the middle of the semester, the computers become a resource for peer interaction throughout the composing process. CSWR instructors encourage students to exchange and develop ideas through electronic cooperative freewrites and collaborative activities for rhetorical modes such as comparison/contrast and argumentation. Using *WordPerfect's* split screen function as part of the course's peer critiquing component assures that the dialogue among writers and critics remains alive. The split screen function allows the student-critic to read a classmate's composition on one half of the screen while providing detailed, qualitative comments on the other half. One instructor has designed a macro which allows students to analyze each other's papers following Bruffee's Descriptive Outline procedure.*

Instructors regularly use the operations of a word processor to teach revision. But to demonstrate the accessibility word processors bring to revision, they introduce the principles of global revision in terminology corresponding to functions on a word processor: insert (add material); delete (eliminate material); block moves (reorganize sections of the text); and typeover (completely change sections of the text). Furthermore, to increase students' awareness of the elements of style involved in writing and revision, many instructors have adapted pre-existing activities for the computers. Following the practice of classical rhetoric, one instructor asks students to type sample texts on their computers and do modeling and copy-changing activities to analyze the primary rhetorical and structural features of a prose passage. After in-class discussions of specific principles of grammar and style, other instructors again use the split screen function to have students stylistically revise a text already on working diskettes.

By the final third of the semester, students, now accustomed to computers, compose, critique, and revise their compositions entirely on the word processor. Approximately one-third of the semester's class sessions includes word processing activities. As the use of computers becomes more intensive, usually two or three meetings in a two-and-a-half-week unit are reserved as "Computer Workshop" periods. Because the CSWR also serves as an evening writing laboratory, students can easily complete exercises and compositions begun in class. To provide additional writing assistance and instruction to students writing with word processors--who may or may not be enrolled in a computer intensive writing seminar--the English Department's Writing Center has two IBM PS/2 Model 30 computers available for students to use when meeting with peer tutors to discuss their writing projects.

As mentioned previously, since Fall 1987 the CSWR is equipped with sixteen IBM PS/2 Model 30 computers. Every four computers share a printer. Twelve are attached to three IBM Proprinter II near-letter-quality dot matrix printers; the remaining four are connected to a QMS Kiss laser printer. All of the classes held in the CSWR use *WordPerfect 4.2* word processing program. During evening lab hours, students may also bring in their own IBM-compatible word processing programs. The College's three other computer labs also have twelve IBM PS/2 Model 30 computers, along with IBM PC's, Apple MacIntoshes, and a selection of word processing programs. To alleviate the problems incurred in classroom instruction because of the lack of a network in the CSWR, the English Department has recently purchased an In Focus High Resolution LCD Panel (#6448-AV).

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* Bruffee, Kenneth A. *A Short Course in Writing*. Winthrop Publshers: Cambridge, 1972.

The computers and composition program at Skidmore College is still young and growing. Quantitative evidence of the program's effectiveness is unavailable. Qualitative data, however, is available from course evaluation students complete at the end of the semester. Most students who chose to comment on the use of the computers in their writing seminars responded favorably. One student called the addition of computers to the writing class "valuable and helpful." Another student concluded, "The use of the IBM computers was a really good idea. I was able to write clearer, more efficiently." By the end of the semester, one student was so acclimated to composing on a word processor that he admitted to having difficulty writing a final examination in long-hand. During course registration periods, students now eagerly inquire about enrolling in writing seminars taught in the CSWR. Nonetheless, not all students are convinced of the advantages of learning to write using a word processor. One student complained, "I think everything that we were supposed to do on the computer could have just as easily been done with paper and pencil." Although the degree of ease is debatable, perhaps this student's criticism unknowingly provides an accurate reflection of the role of computers in a composition classroom: computers are not technological wizardry to eliminate the intellectually demanding aspects of writing. They are, however, a technological aid which clarifies and assists in the teaching of writing and the important process of learning to write effectively in college.

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SLIPPERY ROCK UNIVERSITY
SLIPPERY ROCK, PENNSYLVANIA

This program at a state university presently enrolling 7,000 students offers basic writing, freshman composition, and upper-division writing courses in its own computer lab housed within the Writing Center. The Writing Center lab (opened Fall 1988) is one of six such computer labs on campus and is equipped with twenty-four IBM "model-25" personal system/2 computers. Students use WordPerfect 4.2 and PC-Write 2.7 for word processing and programs such Writer's Helper, Organize, and Quest, as well as locally written lesson-files, for writing strategy assistance.

Slippery Rock University of Pennsylvania, a state university opened in 1889, presently enrolls almost 7,000 students, the majority of whom will be computer literate when they graduate. The computer writing program at Slippery Rock began in 1984 when the University showed its commitment to computer technology in higher education by releasing faculty from various departments to staff a computer literacy course offered by the Computer Science Department and by planning for five computer labs on campus by 1989. The English Department contributed by forming a Committee on Computers and Writing, one charged with exploring ways of funding an English Department computer writing lab.

As an outgrowth of the Committee's efforts, the Department requested twenty-five computers, planning a fully online computer/writing center, one that would be humming with electronic disk-drives and glowing with words written on bright screens. Instead, the Department was given one computer, an IBM-PC and directions to the University's initial computer lab housed in another building, shared by every other department's students. After the realization hit--the Department was not getting more computers that first year, just one computer and one dot-maxtrix printer--we began unpacking the few boxes, wondering what a department does with one computer.

At first, we installed the computer in our chairperson's office, thinking it needed a secure room, one that could be locked. Immediately some Department members felt alienated from the new acquisition, sensing the machine was not meant for their use, feeling the technology was something to be hoarded. The machine might be secured, but it would never be used if kept in that office. Thus a space for it was cleared in the mail room by moving boxes and filing cabinets. Then faculty felt welcome to touch the machine. Most of them did just that as they stumbled around, looking for where the mail boxes had been moved.

That was how it began. For the past four years, several writing teachers at Slippery Rock University have been using the lone computer and the original computer lab. Since then three other labs have opened on campus and the English Department now has its own lab in the Writing Center.

Some faculty in the English Department, many of whom were trained in literature and hired prior to 1972, were predictably traditional, almost reactionary, about computers in writing classes. One senior English professor said, "I think word processing is good. But I can't even get students to use typewriters, so I really don't think it would be realistic to try to get them to use word processing." Another answered the inquiry whether she required students to know/use word processing, no: "They have to learn words first." Fortunately most of the twenty-eight members of the English Department, introduced slowly to the computer, have been open to word processing, suggesting it to students--"Every student should have computer skills, especially word processing for English"--and expressing a desire to learn it--"I would like to [have my students] use computers, but I don't know how myself."

The members of the Department hired after 1977, the year the Apple II came out, have become, by and large, the "silicon seven" of the Department and the new "computer nerds" of the University. One junior faculty member, when asked about her hopes and beliefs about computers and writing, said, "I hope more students learn word processing, an activity increasing fluency and improving revision strategies (not to mention enhancing keyboard skills)." Another believes, "The uses of the computer in all writing courses will revolutionize writing instruction in many ways." And so, the seven began to teach others, students and faculty alike, to use word processing.

In general, students we have exposed to word processing have embraced the technology. One college freshman, discussing word processing in an in-class free-writing activity focused on individual writing histories, wrote, "I didn't like writing too much in high school.... [Word processing] is great! It's so much easier for me.... The more you use it, the easier it gets.... You wonder why you never tried it before." Another wrote, "In high school, I did just enough to get by. [Word processing] makes writing easier because you can erase easily or change your mind without having to start a new page." A third wrote, "I dreaded writing in high school.... [Word processing] is easier than pen and paper." One reaction to writing in high school, "hated it," is followed by the additional comment that word processing has "made writing more enjoyable."

The English Department, not generally considered technologically astute by the University community, now has its own computer lab, in the Writing Center, equipped with twenty-five IBM PS/2 model 25 mircocomputers. Classes are scheduled in this computer-equipped Center. The teachers of these classes, believing word processing will increase fluency and improve revision strategies, see a computer-intensive Writing Center as an ideal setting for qualitative and quantitative assessment of the impact of computers on the writing ability of Slippery Rock students.

Another support for the computer writing program at Slippery Rock University has been the offering of a graduate level course in the summer, Teaching Writing with Computers. This course, one of the few such offered in the country, explores the application of computer-assisted instruction to the teaching of writing and looks at how rhetorical theory informs the use of computers in writing classes. Members of the University community and others from neighboring high schools and community colleges study ways in which technology can help pedagogy.

The faculty whose general approach to teaching writing is part of what Maxine Hairston characterizes as the "emerging paradigm" (process-centered, collaborative, and concerned with rhetorical strategies), have found the computers and word processing a great support. Of the twenty-eight members of the English Department, three make computers and word processing a course requirement; another ten strongly encourage students to use word processing. Those whose general approach is more the "current traditional rhetoric," to use Young's term,* see the computer as a "new fangled" electric typewriter. The fifteen remaining in this camp vary in their hostility toward computers from, "Don't know a damn thing about them," to, "I wish I knew something about them."

The number of students involved in the computer writing program at Slippery Rock University during any given semester depends on the number of faculty involved. The courses in the computer writing program include Basic Writing, College Writing I & II, Technical Writing, Business Writing, Traditional Grammar, and several graduate courses--Teaching Writing with Computers, The Teaching of Writing, Rhetoric and Linguistics, and Advanced Technical Writing. But the majority of students affected by the computer writing program at Slippery Rock University enroll in two semesters of College Writing, taking a six-hour sequence of Freshman English. Each section of computer-supported writing class has twenty-five students.

English teachers take instructional time in the classroom to teach students how to use a simple word processing program, *Perfect Writer 1.0* at first in 1984, *PC-Write 2.7* or *WordPerfect 4.2* currently. What goes on in class typically is that the students are given a two to three class orientation in computers and word processing. After that, students faculty expect to do their work on the computer; some faculty require papers to be word processed and others merely suggest it.

My sense is that reluctant writers become writers by writing, a change that word processing encourages. Others may still feel that writing in itself is not enough to improve writing. They search for more software, more computer-assisted instruction. Yet a computer with a good word processing program can also deliver instruction, providing individualized instruction through lesson files created by the instructor and read by the student like other text files. The lesson files contain prompts to writing, teaching a myriad of skills--paragraphing, prewriting, editing--and suggesting a variety of writing tasks. For example, many teachers in our department assign some form of the autobiographical essay. This can become a computer-assisted lesson. One of the graduate students in the Teaching Writing with Computers course, Rebecca Laubach, a ninth and tenth grade teacher at Mars High School, created a file, called "Memory," with no programming knowledge and nothing more than a word processing program. When one of our students loads the file, here is what appears on the screen:

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* Young, David J. *The Structure of English Classes*. St. Martins Press: New York, 1980.

Screen 1 **Memory**

THIS IS YOUR LIFE

____
(Type your name here)

AS YOU MOVE THROUGH THIS LESSON, TRY TO CENTER EACH SET OF DIRECTIONS ON THE SCREEN SO THAT YOU SEE ONLY ONE SET OF DIRECTIONS OR ACTIVITIES AT A TIME.

Screen 2 **Memory**

EVERYONE has unforgettable memories from CHILDHOOD. These memories come from
* experiences at school,
* vacations with our families,
* time spent with friends,
* or just everyday life.
In this lesson, you are going to write about events in the Past.

Screen 3 **Memory**

In the spaces provided below, complete as many of the following sentences as you can.
1. The things that frightened me as a child were ...
2. My happiest memory is ...
3. My childhood was unusual because ...
4. I got into trouble when...
5. When I was young I admired ...
6. My confidence showed when ...
7. My saddest memory is ...
When you've done as many as you can, move on.

Screen 4 **Memory**

Now you are going to EXPAND
one of the sentences
you wrote into a paragraph.
Choose any sentence you want
and COPY/PASTE it below in Screen 6.

Screen 5 **Memory**

If you remember how to do the copy/paste process
move ahead to screen 6.
The Copy/Paste Process:

1. the beginning of the text you wish to copy by placing the cursor at the spot and pressing <F3>.
2. The text will be highlighted as you move the cursor through the text.
3. Mark the end the same way.
4. The text will now return to normal.
5. Move the cursor to the place where the copy should appear and press <F3> to accomplish the move.
6. Press <F3> to release the copier.

Screen 6 **Memory**

Place your sentence here -->
Now, in a few more sentences,
EXPLAIN WHAT YOU SAID.
You can give two of three short sentences that illustrate your point, or you can tell one long story.
Begin typing by placing the cursor at the end of the sentence you placed above.
When you are finished move on to the next screen.

Screen 7 **Memory**

Now that you have something written,
you might want to revise it.
Go back and REREAD the paragraph you have just written.

While you are reading, you might ask yourself these questions:
* Does my paragraph clearly express the idea I had in mind?
* Could someone who doesn't know me understand what I am saying and why I am saying it?
If not, you may want to make some changes.
Be sure to save this file and get a PRINTOUT.
End of Memory

A full treatment of lesson files--how to create them and how to use them--can be found in Dawn and Ray Rodrigues', *Teaching Writing with a Word Processor*, an *NCTE/TRIP* booklet. During any given semester, students complete a variety of assignments on the computer. Some are lesson files; some are invention or revision programs, such as *Quest*, *Writer's Helper*, and *Organizer*; some are style checkers, such as *Rightwriter*.

Slippery Rock University is an IBM campus. Three of its four labs are equipped with IBM-PC's, some with 640K and color monitors. One lab, the Education Department Lab, has both Apple ad IBM equipment for student teachers who need to be familiar with both. The newest lab on campus and the English Department's Writing Center lab are equipped with the OS/2 operating system, using the 3.5 inch disks.

The evidence of the effectiveness of the computer writing program at Slippery Rock University is largely anecdotal at this point. One freshman says, "Word processing makes it easier to rewrite. With word processing you can change words around without rewriting the whole paper." Another continues, "You can erase whatever you want and add things wherever you want to. If you make a mistake, you can fix it and print it over in a matter of two minutes." Revision is encouraged by computers. As one student explains, "Word processing makes it much simpler to change things around and make adjustments without retyping the whole paper. It's made a big difference."

It is obvious that a word processing program allows students to become active writers, but some of our senior faculty make the charge that the computer is nothing more than an electronic typewriter. The students answer the charge when they write about the effective changes in their writing. One student writes, "Working on a word processor makes writing ... more exciting; therefore, it has prompted me to write more." Another student writes about a change in her perception: "Writing with a word processor is useful at times; you can actually see your writing." To me, the most convincing argument that word processing does more than function as an electronic typewriter is offered by a student who writes, "I enjoy writing with the word processor because I am able to sit at the computer and try out different ideas in many different places of my writing." Word processing encourages risk taking.

Of course, Slippery Rock University's computer writing program is not perfect. The two biggest complaints heard from students are that the labs, spread out as they are, are inconvenient--"It was such an inconvenience to get to the computer room"--and that writers now need keyboard skills--"I'd rather write in pen because I'm slow on punching the keys."

Some of the initial experiences of the students will be as irritating: "In a way, it does make everything so much easier, if you know what you're doing. But for us unfortunate people who don't know how to use them, it can be very irritating and time consuming." But on the whole, more of our students agree with the one who writes, "At first, I hated [word processing] because I didn't know how to use the computer properly. Now I like it very much because using the computer is a lot of fun and making corrections is a lot easier."

Collaboration and communication by colleges across the nation will help discover and promote the widespread success stories and give us a sense of esprit de corps as well as a sense of the impact of our efforts. The technology is here but the applications are quite diverse. Some campuses require students to buy computers and use them during their four years of college, forcing them, in effect, to become computer literate. Other campuses, viewing computer-assisted instruction as more cost effective than human instruction, are using computers to replace faculty in learning centers--the nightmare application of technology. We need to see who is using computers and how they are being used. I think of the problem as analogous to the problems inherent in writing across the curriculum programs--some are very structured, held together by administrative design; others are loosely formed, held together by a sense of commitment. I believe the loosely structured computer writing program, the style at Slippery Rock University, will make the greatest impact, enabling students to acquire a much fuller writing-as-learning experience.

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UNIVERSITY OF SOUTH CAROLINA
COLUMBIA, SOUTH CAROLINA

This program at a large state university offers computer-related writing instruction for some freshman computer sections, as well as advanced writing and business writing classes. The English Department has a classroom equipped with twenty-four networked IBM PS/2-25 computers. A separate lab serving the College of Humanities and Social Sciences contains approximately eighty computers, two-thirds IBM, one-third Macintosh. WordPerfect and Macwrite are the most commonly used software. The Center for Computers and Writing is a resource library and software demonstration area for faculty and graduate students who use computers in teaching or research.

History

The first writing course to make extensive use of word processing at South Carolina was taught by a graduate teaching assistant in 1983. Students in this freshman English class used *Script* software on the campus IBM mainframe. Shortly thereafter, the computer center serving the College of Humanities and Social Sciences installed twelve IBM Personal Computers, which were used by several sections of both our Advanced Writing and Business Writing courses. By the fall of 1985 enough PC's were available to justify requiring all instructors of our Basic Writing course to incorporate word processing. At that time there were ten such sections, each containing sixteen to eighteen students. Each section met at least twice in the computer lab to learn *PC Write*, and most instructors had their classes meet in the lab every week or two throughout the semester. Although there were some scheduling problems, and several instructors were initially inexperienced with the software, most agreed that this experiment was a success. Students readily learned *PC-Write*, their papers were longer than in previous years, and they seemed to take more time with their work.

In 1986-87, upper-level writing courses routinely used the computer lab, and freshman-level teachers also had this option, with about one in four taking advantage of it. One constraint was the shortage of PC's and the premium placed on class time in the already overtaxed lab. Most faculty using these facilities required students to submit at least one paper written on computer; some expected all final copies to be printouts. Few used software for anything other than word processing or spell checking.

The fall of 1987 saw major changes in computer use in English courses. One classroom was fitted out with twenty-five IBM PC's including an XT with hard disk for the instructor. This room was established primarily for writing classes, and ten sections (mostly upper-level courses) were scheduled into the room. When not used for class, it became a lab available to any student on campus. Software available on a check-out basis included *PC Write*, *WordPerfect*, and *Wordstar*. Because of major renovations and expansion, the computer lab serving the several Humanities Division departments was out of commission for much of 1987-88: this meant that many instructors wishing to integrate computer use fully into their courses were unable to do so. By Fall 1988, renovations were completed. The lab now contains approximately one hundred computers for undergraduate use, and the computer classroom continues with twenty-five machines. The total will include IBM PC's, IBM PS/2 25's (networked), and Macintosh computers (networked).

Faculty Interest in Computers

The increased emphasis on computers in writing at our university grows out of a long history of computer use within the English Department. Current chairperson, Joel Myerson, has for a number of years been using the campus IBM mainframe in textual editing and in preparation of the annual *Studies in American Renaissance*, which he edits. Trevor Howard-Hill is known for his computer expertise in the preparation of concordances and bibliographies in Elizabethan drama. William McColly has used computers in composition research and stylistic analysis. Joseph Katz, an authority on Stephen Crane, is an expert computer programmer and is in demand as a software consultant and reviewer.

Robert Oakman, previous Director of English Graduate Studies, wrote *Computer Methods for Literary Research* (University of Georgia). Paula Feldman recently co-authored *The Wordworthy Computer* (Random House), and three faculty members have collaborated on *The Microcomputer and Business Writing* (Random House). Ken Autrey published a bibliographic pamphlet, *Word Processing and Writing Instruction* (University of South Carolina) and regularly writes "Printout," a book review column for the journal, *Computers and Composition*.

Bill Rivers, Director of Freshman English, has had considerable experience with technical writing and has negotiated a contract with NCR for a document validation center under the auspices of the English Department. This center is now in operation and has as its primary purpose the testing and quality control of technical manuals. An asset to the technical writing curriculum, this arrangement also has brought a substantial donation of NCR computer equipment.

Another recent indication of departmental interest in computers and writing is the establishment of the Center for Computers and Writing. Begun in August 1987, its goals are as follows:

1. To establish a library of software and printed materials relating to computer use in writing instruction.

2. To serve as a demonstration center, enabling high school and college teachers in the state and region to assess software and obtain information regarding the pedagogical uses of computers in writing instruction.

3. To conduct demonstrations, workshops, and symposia for University faculty as well as teachers from schools and colleges in the surrounding area.

4. To serve as a center for research concerning computers and writing instruction.

Ken Autrey is currently Director of the Center, which has a twenty-member multidisciplinary Advisory Board, and also works closely with the English Computer Committee.

Current Status of Computer Use in Writing Instruction

The English Department at South Carolina offers a Ph.D in rhetoric and composition, and there is considerable interest in current rhetorical and compositional theory among faculty and graduate students. Most freshman courses are taught by graduate teaching assistants. With qualifying Advanced Placement scores or excellence performing on the Department writing placement test a student is exempted for a semester or (rarely) a year of freshman English. Most students take English 101 initially. It is an expository writing course in which students generally use a rhetoric and/or reader. A small number of students (perhaps ten percent) must take English 100, the basic writing course, where the focus is on brief but intensive writing assignments coupled with individual conferences and Writing Center tutoring.

A number of instructors use a "workshop" approach in their classes, placing an emphasis on examining and critiquing student work, on peer groups, and on eventual classroom "publication." We have found that this approach works well in a computer classroom, except that small group work is often hampered by the intrusion of computer equipment and the resulting lack of space. The standard second semester course (English 102), Composition and Literature, requires studying and writing about literature in the three major genres: fiction, poetry, and drama. Instructors have tended to place less emphasis on computer use in this course largely because by the time most students take the course, they are already familiar with word processing.

As more computers become available and as we gain experience, we continue to modify our program. In the 1988-89 college year we had a rotational system for the computer classroom. This means that a composition class meeting three times a week rotates into the computer room every third day. The other two days are spent in a traditional classroom. Approximately twenty classes are thus able to use this room, over half of these being freshman classes. Teachers who do not choose this plan may arrange two or three sessions of computer orientation for their students in the larger Humanities Division lab. A small number of instructors will orient their students to the Macintosh system rather than the more prevalent IBM machines. Not all teachers require their students to use computers, but we can guarantee all students access to computers. *WordPerfect* continues as the standard IBM-compatible software. Other types of software (style checking, outlining, etc.) have been used only experimentally.

The next edition of our *Student Guide to Freshman English* will include several pages of information regarding computer availability on campus and provide general suggestions for using word processors in writing. Fall orientation for teaching assistants now includes a segment regarding ways of successfully incorporating computer use into a writing curriculum. These guidelines include the following:

1. Learn the word processing system thoroughly before expecting your students to learn it.
2. Allow at least two complete class sessions to teach word processing fundamentals.
3. Don't try to teach all word processing features at once. Begin with only what is needed to write and revise a brief essay, report, or letter.
4. At several points during the composing process, require students to print hard copies for revision, editing, and class comment. At least initially, require students to turn in several of these interim drafts along with the final paper.
5. Because students do not naturally take advantage of the computer's features for revision, teach this skill as a specific set of techniques. For example, show students how sentences can easily be isolated, changed, and then put back into paragraphs.
6. Introduce supporting software (spell checkers, outliners, etc.) only after students have mastered word processing.
7. If students use an IBM system, teach at least the fundamental DOS commands.

The Future of Computers in Writing Instruction at South Carolina

With the full use of our computer classroom, greater numbers of computers on campus, and increasing activity in the Center for Computers and Writing, we anticipate growing interest in computer-assisted writing among faculty and students. In the coming year we will be experimenting with IBM Local Area Networks and will be trying *Livewriter*, an interactive software network for the Macintosh. We will be working to set up a network of high school and college English teachers around the state who will communicate via electronic mail and online bulletin boards. We will work to establish an annual symposium on computers and writing. Eventually, desktop publishing, videodisc systems, and optical scanning technology will likely be used on our instructional program.

Graduate students are increasingly interested in thesis projects involving computers: some of this interest has been stimulated by the course in computer methods, now an option for all graduate students. Others have developed areas for research arising out of their own teaching with computers. One graduate student, for example, has completed an ethnographic study of an Advanced Writing class taught in the computer classroom. Another has prepared a bibliography of articles on computer-based revision and style-checking.

Although the computer has its vocal detractors within our English Department, like the prominent scholar who refers to them as "devil machines," the computer revolution has generally been greeted here with cautious enthusiasm. Research conducted among faculty members two years ago by Professor Carolyn Matalene suggested that those who use a computer in writing fall into three catagories: those for whom it is merely a glorified typewriter, those who do some revising of handwritten drafts at the screen , and those who are complete "converts," using it from start to finish for their books and articles. More and more seem to be falling into the latter two catagories. In other ways as well, the Department appears fully committed to exploring the potential of computers to make us better teachers, scholars, and researchers.

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UNIVERSITY OF SOUTHERN CALIFORNIA
LOS ANGELES, CALIFORNIA

The University of Southern California is a private university which requires two semesters of freshman composition. Project Jefferson, a hypertext application designed for the second semester course, uses online databases to teach students research and critical thinking skills essential for the writing of research papers. Its dominant feature is an electronic notebook through which students can access an assignment, locate information in an encyclopedia, and search a database of bibliographic information. Project Jefferson utilizes Hypercard and runs on Macintosh SE's each equipped with a hard disk.

Background

Project Jefferson is a program at the University of South California that uses a hypertext system in a freshman writing course. Using Hypercard, a hypertext system for the Macintosh that allows even novice users to organize and retrieve information with relative ease, the project teaches students not only to manage data but also teaches the critical skill of accessing and using information for academic writing. We developed Project Jefferson because we wanted students to do research but we were unhappy with what they were producing in our courses, and unhappy too with the way we were teaching or not teaching research issues in the writing course.

The Freshman Writing Programs

Goals

The Freshman Writing Program at the University of Southern California is an independent academic program which is responsible for two freshman courses, Writing 101 and 102. The program has a dual goal: to teach students to write acceptable college-level exposition and to teach them to use writing as a means of exploring and clarifying ideas. The program also aims to give students knowledge about the writing process and to develop their confidence as writers so they can continue to improve their writing skills after they complete their general education writing requirement.

Workshop Class Structure

To enable students to develop writing skills, the program has adopted a process approach to writing that individualizes instruction through learning techniques such as small group collaborations and instructor conferences. These workshop activities involve students in the writing process, providing assistance and instruction as students compose and revise their assigned papers. Although instructors give brief lectures explaining rhetorical strategies, grammatical and stylistic principles and hold class discussions to develop assignments or to discuss readings related to assignments, students spend the majority of class time participating in reading and writing activities: generating ideas, drafting essays, reading and discussing their own writing and that of fellow students in preparation for revising. Through extensive use of individual and small group peer conferences, students receive maximum feedback on their writing and increase their involvement in and responsibility for learning.

The program also incorporates the use of a Writing Center, which provides one-to-one tutorials for any student who wishes or is required to have individualized assistance in writing. Students of all levels come to the Writing Center to work on papers at all stages in the writing process. The Writing Center houses two adjacent computer labs, one of IBM PC's, the other of Macintosh SE's. Project Jefferson is located in the Macintosh lab.

Composition 101

During the first semester at the University, students usually enroll in Composition 101, a course which introduces the rhetorical strategies used in writing college papers. It also emphasizes understanding the process of writing and learning composing techniques to help generate ideas and revise one's writing. Other important emphases include studying methods of critical analysis for exploring topics and organizational structures appropriate for more complex analyses and arguments. Writing assignments are designed to foster a critical perspective by asking students to examine alternative viewpoints on issues and to develop an understanding of the criteria for effective college-level writing. At the conclusion of Composition 101, students are expected to compose a piece of expository prose that effectively conveys the writer's intention and thoughtfully analyzes a topic or issue from more than one perspective.

Composition 102

Composition 102, which students often take during their second semester, gives further instruction and practice in writing expository prose. It builds on the composing skills and strategies taught in Composition 101, but differs in its emphases and objectives. In Composition 102, students write essays focused on important issues and ideas drawn from an external world, broader in time, space and intellectual scope than their familiar personal world. Assignments in

Composition 102 emphasize the analytic and argumentive skills needed to develop the reasoned arguments that students will be expected to write during their college and professional careers. Therefore, Composition 102 focuses on strengthening students' ability to gather information from a variety of sources, to critically analyze readings, to discover alternative viewpoints, and to select evidence to support an argument that convinces the reader primarily thorough reasoned analysis.

The Research Paper and Composition 102

Since Composition 102 is concerned with developing research and critical thinking skills, one would assume that at least one writing assignment would be a traditional "research paper" involving use of outside courses. Yet, although research papers have long been considered an essential component of the composition class, the poor quality of the resulting papers and the difficulties students have often had in accessing information from the library have raised important questions about the value of this type of assignment. As many weary composition instructors will acknowledge, student research papers are often uninspired, occasionally plagiarized and too often futile exercises for both students and instructors. In fact, over the past twenty years, there has been a strong temptation and a tendency for composition teachers to ignore research paper instruction altogether.

However, despite these difficulties associated with the research paper, it is also recognized that it would be a great disadvantage to students if the teaching of research skills were abandoned in undergraduate education. Research skills are now recognized as critical in order for students to learn in higher education and to continue to learn on their own. The acquisition of such skills can have tremendous impact on students' academic, professional and personal achievement. What seems to be emerging, then, is the sense that instead of eliminating the research paper from the composition class, the profession should be creating a new model for instruction of this important skill.

A New Model for the Research Paper--the "Researched Paper" and "Staged Acquisition"

Recognizing the importance of developing a new model for the research paper, the Freshman Writing Program at the University of Southern California has created what has been designated the "researched" paper to distinguish it from the traditional "research" paper with all of its attendant difficulties. The paper, which also may be termed a "documented" paper is a relatively short paper (five to eight pages) concerned with a substantive, multi-faceted content issue, which may originate with personal experience but is ultimately text-based. It requires students to immerse themselves in a topic, examining key issues, locating background information, and critically evaluating and using secondary sources, but it is not intended to be the more extensive information-based "research" paper associated with the old model. Rather, students undertake research in order to formulate an informed position on a complex issue. They are not simply collecting information as a means of exhibiting research ability.

The "researched" paper is conceived of not only in terms of purpose and form; it also implies a sequenced pedagogy termed "staged acquisition," which is implemented through a series of research-oriented writing activities. What this means is that before students are expected to generate a position or evaluate and locate sources for a complex topic, they first complete preliminary activities and assignments enabling them to develop research "skills" which can be applied to a variety of research-oriented writing tasks. Critical reading, notetaking, summarizing and paraphrasing writing, analyzing, and synthesizing are some of the "skills" deemed necessary for students to have before they can write a "researched" paper.

Moreover, the concept of "staged acquisition" refers not only to skill development; it imposes the notion of sequence on information acquisition as well. Sequenced researched paper assignments thus have a dual function: They enable students to acquire the necessary skills for undertaking a complex writing task involving outside research and they gradually immerse students in a subject area, in order for them to write about it with adequate knowledge and conviction and to understand the relation of their own position to the positions of others.

The content areas thus far selected for the new model have been those with an engaging ethical, social and political focus. Issues such as affirmative action, search and seizure, freedom of speech and the press, the rights of students themselves, or the problems of the homeless and the elderly have important implications for contemporary society, and thus, we find, provide rich forums for discussion and infinite topics for assignments involving secondary research.

Project Jefferson: a Hypertext Application In Information Retrieval

These concepts, the researched paper and staged acquisition, have been implemented through the creation of a topic-specific online information retrieval system which serves as an important first step in preparing students to incorporate sources into their papers in Writing 102 and, ultimately, to use the full range of library resources. The system, which has been termed Project Jefferson has been developed in conjunction with the University Library and the School of Engineering.

Project Jefferson runs on twenty-two Macintosh computers provided partially by a grant from Apple Computer and uses the concept of hypertext to enable students to access information and secondary sources for their papers. It also enables students to acquire background information about key terms associated with their topics before they attempt to locate secondary source materials. In addition, hypertext layering allows students to establish links between key terms, thus simulating the associative cross referencing characteristic of the research process.

The system, located in the Macintosh lab adjacent to the Writing Center, also contains a database of topic-specific articles, which the user searches to find references for use in composition class assignments. Thus, Project Jefferson enables students to work through a viable model of conducting research through staged acquisition, a model which they will then be able to replicate when they conduct research in the library.

Components of the System

Project Jefferson consists of the following resources: a word processor (*Microsoft Word*) to facilitate the generation, writing and editing of texts, the Jefferson Notebook, "Encyclopedia," which provides history and definition of key concepts, "Citations," which consists of a database of references to articles pertinent to the topic of the assignment, and, ultimately, access to the library online catalogue including magazine and newspaper indexes. To use Project Jefferson, students must copy the Jefferson Notebook icon onto their own formatted disk.

Working with the System

Focus Questions, Assignment, Encyclopedia

A typical sequence students might complete in working with Project Jefferson would involve the following: Students usually begin with the Notebook and choose the section marked "Assignment." Within this section is a sub-section called "Focus Questions," which asks students questions about their topic to enable them to see their own feelings and background on the subject of the assignment. Student responses to these questions are written to a *Microsoft Word* file on the student's disk. Thus, students can use freewriting and discussion in order to become preliminarily involved with the topic. After working through the Focus Questions, students then look at the assignment itself, attempting to identify key terms about which they might need additional information--background material or definition of unfamiliar word or concepts. Students can then locate this needed information through the Encylcopedia section, which consists of a scrollable alphabetized list of terms leading to informational screens linked relationally to other information screens. This system of information screens and related terms defines a rich hypertext environment that students can peruse, following the relational pathways that they choose.

Copying and Notetaking Tools

As students navigate the system, they are able to use several tools either to save information or to take notes. When students locate information in the Encyclopedia or Citation sections, a camera icon appears that enables them to take a picture of workspace material. A pop-up notepad enables students to take notes and or respond to the assignment. Information saved through the camera icon, notes saved through the notepad, and responses to the focus questions can then be accessed through a section of the notebook called "Saved Information," which can then be converted into a *Microsoft Word* file.

Citations

Once students have explored the Assignment and Encyclopedia Resources, they then move to the Citations resource, which provides online retrieval of references and abstracts for a database of texts that are essential to students in writing their papers. The texts themselves are not online (for copyright reasons), but are available in hard copy on-site and elsewhere. To launch searches for relevant texts, students choose descriptors like those that appear in the assignment and the Encyclopedia. The system then searches for all texts indexed on the chosen descriptor or descriptors. Students can launch queries either broadly or narrowly, depending on the extent to which they have focused their topics.

Protopaper

Once all the information and notes have been researched and saved into a section of the Notebook called "Saved Information," they may be organized into a "Protopaper," that is, a preliminary structure from which a research paper can ultimately emerge. The Protopaper section involves cutting and pasting information and then utilizing outlining tools to organize the material.

The Impact of Project Jefferson

Project Jefferson has been used only for three semesters, and thus far, only selected instructors in the Freshman Writing Program have introduced the Jefferson software into their classes. However, as the software becomes more stable and as instructors become more experienced in working with it, we expect that this approach to the research paper will become the dominant one in the program. Moreover, once authoring tools are complete, enabling instructors to add new assignments and information with relative ease, the system will appeal to a greater variety of Freshman Writing instructors.

At the present time, students who have been using the system are extremely enthusiastic about the software and about using the computer for all writing tasks.

Moreover, several other departments on campus, in particular, Anthropology and Gerontology, have adopted the Jefferson model for their own research-oriented assignments and are currently in the process of assembling databases pertinent to their own disciplines. We expect that this model of locating and using information is likely to have profound implications for the way research skills are approached throughout the university.

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STATE UNIVERSITY COLLEGE
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State University College at Buffalo is a four-year public school with a twenty-four station VAX networked laboratory. Our program uses Digital's All-in-One word processing software with Thesaurus Usage and Spelling Checker applications. We cater both to freshman and upper-level writing students. In operation only one year, the English Department's computer room is a busy place, with about one-fourth of our writing instructors using the computer in some fashion in their courses.

Buffalo State is part of the State University of New York. The College has about 10,000 students, with freshman writing enrollment of about 1,850 a semester. Class size is limited to twenty-two students, giving eighty to eighty-five sections a semester.

Since 1980, Freshman Writing has been departmentally graded; the teacher does not give the final grade for his/her course. The program has three levels of instruction: 099 is developmental pre-college writing, stressing fluency and basic grammatical control; 101, the first semester of college writing, stresses types of writing, patterns of organization and development, adequacy of development, etc.; and 102, the second semester of college writing, stresses the analytical reading and writing skills used in research writing.

Entering students are placed at their needed level of instruction by a writing placement examination. The student writes two essays--an academic essay (one hour) and a personal essay (one-half hour)--which are read by two teachers using the placement criteria for the three levels of instruction. If the two teachers disagree, the essays are read by a third reader. Placements are compulsory; it is impossible to be exempted from the writing requirement. Approximately twenty-five percent of an entering class are placed in non-credit developmental writing, approximately seven percent are placed in College Writing II, and the rest are placed in College Writing I, except for a few who are exempted from the writing requirement.

At the end of the semester, students write two departmentally graded exams. Preparation materials are distributed before each exam, so students can be fully prepared. Each exam is rated by two teachers, giving four assessments of the student's writing ability. The readers do not give grades but give the placement for the next semester, using the placement criteria. It is possible for a student to be exempted from a course within the sequence.

The program is run by a committee elected by the English Department. The committee prepares the exams, reviews the criteria for each level, makes changes in the syllabi as needed, and orients new teachers to the program. The committee has not tried to establish a uniform method of instruction, a uniform textbook, or a minimum number of writing assignments. Each teacher is free to develop teaching methods, knowing the departmental criteria against which the writing is measured. All teachers read the final exam essays, thereby reinforcing an understanding of the placement criteria. Thus the Freshman Writing program at Buffalo State combines individual teacher freedom with uniform departmental (and college) standards for writing literacy.

Computer Facilities

The Freshman Writing program has its own computer facilities, located on the same floor as the English Department. The room contains twenty-four VT220 terminals and one high speed digital printer, which are connected by the campus network to a VAX 8600 computer. The word processing program used is Digital's *Allin1*, a part of their *Office Management* software. This terminal room, having the terminals which are designed for *Allin1*, is dedicated to word processing. However, there are several other terminal rooms on campus where the students can do word processing by accessing the VAX through the network; once they learn the keys to substitute for the specific function keys on the word processing keyboard the process is quite simple. Printing can be directed to the Freshman Writing printer from any terminal on campus. So although the number of terminals is small compared to the size of the student population, there are substitute facilities for the advanced student.

The Digital *Office Management* and word processing software can be used by students and teachers at various levels of computer sophistication. Right now, both faculty and students are at a beginner's level. In word processing, a student can learn enough in the first class session to start writing an essay. The student does not need to know the whole system in order to use it; specific functions can be learned as needed.

As our faculty become more computer sophisticated, the software has the capability and function to allow a teacher to develop his own writing program. For example, the teacher can write and store standard messages or comments which would normally be written on a student essay. By using the MAIL utility a teacher could develop a paperless writing course, receiving student essays by MAIL and returning by MAIL the essays with interlinear or appended comments. As the teacher reads the student essay on his terminal screen, he can insert his standard comments within the text or append them at the end. Using the utilities within *Allin1* and the *Office Management System*, the teacher can build up personal resources over a period of time to individualize instruction. As most freshman writing teachers know, individual students tend to make the same errors. Suppose that the student has made the same error in sentence structure for the past three essays; the teacher can append some practice material about this sentence structure problem. If the problem persists, further exercises from the stored materials can be sent. These stored materials can be more specific to the problems than what is found in most workbooks: the teacher will not have a catchall category called FRAGMENTS, but will have materials devoted to specific types of fragments.

For the student who has problems with spelling and homonyms, *Allin1* can help as well. Many students in developmental writing have difficulty with homonyms and many cannot recognize misspelled words. The *Allini1* "usage" checker will give the definition of "to, two, and too," so the student can check what he has typed against the definitions. Likewise, in spelling, the checker will give the correct spelling for what it considers the word to be, but the student must check to see if the suggested word is actually the right word. These aids are not automatic correctors; the student must interact intelligently with the computer. For the developmental teacher in our department, the teaching of homonyms and spelling can be turned over to the computer. There is no need for the teacher to spend time in class teaching these items. The student can be taught how to use the computer facilities and then be told that his essays must use homonyms correctly and spell words accurately.

Use of the Computer in Writing Classes

The departmental computer room has been open for just over one academic year. The use of the computer facilities is optional for the teacher. Many of the teachers have taken the three-hour training course given by Digital. Others have attended training session conducted by the Director of Freshman Writing. One year after the establishment of our department computer facility, about one-fourth of the writing teachers are using the computer in some fashion with writing classes. Several teachers conduct their writing classes in the computer room when it is available. One teacher required the term paper for English 102 to be written on the computer. Our blind teacher has all his student essays sent to him by the MAIL facility. He writes his comments into a computer file and prints them out for his students. Dyslexic students with extreme spelling problems are allowed to take their final departmental writing exams on the computer. Several teachers use the room for personal work (several dissertations are being written), but have not required their students to use the computer. Many students use the computer for writing their essays even though the teacher does not require them to do so. They have learned how to use the computer in a writing class in a previous semester, so they continue to use it on their own. In operation just a year, the room is full many times during the day.

When the room was being planned, it was planned as a lab, not a classroom. At the beginning of the semester, it was assumed that each teacher would need to meet a class several times in the computer room to teach the basic use of the computer for word processing. After that, the teacher would require work to be done on the computer on the student's time, not class time. Student assistants are available most of the day to help students with problems and teach students who want to learn on their own.

Future Plans

We do not have a program for teaching writing by computer, and we probably will never develop one which all the teachers in freshman writing will use. But we have two objectives for using the computer in the writing courses. First, we want to help each teacher develop ways of using the computer to best incorporate the individual teacher's ideas and methods about the teaching of writing. Second, we want to help students become so used to using the computer for essay writing in the freshman writing courses that they will continue to use the computer for other writing courses and for writing during the rest of college. (Even if they drop out of college, as do many of the students in developmental writing, they will have learned a job skill as a by-product of freshman writing.)

One great problem in freshman writing is the proliferation of rhetorics, readers, handbooks, and workbooks. Now that the computer has become available on many campuses, the influx of word processing programs, textbooks on computer, etc. has begun. Luckily for us, most of these computer aids are written for PC's, not mainframe computers. Our faculty are not tempted to waste their student's time having them learn Company X's word processing program; instead our students learn a major word processing program which is used in businesses -- Digital's *Allin1 Office Management System* has forty percent of the major business market.

At Buffalo State each teacher will be developing his own computer materials, designed to meet individual problems. As teachers learn how to write and store insert files for specific writing problems, the number and diversity of files will grow. Over a number of semesters, the teachers will be able to create a number of re-usable insert files. Probably, there will be much sharing of files among teachers, but each teacher will probably edit each gift file to give it his own teaching voice. One goal of this program is to have a terminal in each individual office, so that each teacher can teach a "paperless" class, using the MAIL facility to transmit essays between student and teacher.

Evidence of Program's Effect

Ideally, each teacher who wants it should have a computer classroom. To achieve that, we would need six computer rooms the size of our present one, and these six room would be scheduled forty hours per week. This will never happen, so the teacher who likes to teach his writing classes in the computer room can do so only by scheduling his classes early in the morning or late in the afternoon. Still in this first year of use, several teachers have been able to hold many of the writing sessions in the computer room. Many teachers like teaching on the computer. As for our students, they too seem enthusiastic.

Students can use the computer as a note pad to list ideas when planning to write on a topic. With the ideas listed, a system of priority on organization can be thought out. Then, leaving these ideas on the screen, the student can begin to compose, referring back to the top of the file for his ideas. Students who have learned to compose at the terminal find it easier and quicker than writing by hand at a desk. For one thing, they can read what they have written. For many students, their handwriting is so poor that they cannot tell when they have misspelled a word or mispunctuated a sentence. Their periods and commas look alike, as do most capital and lower case letters.

In addition, the computer instills discipline and carefulness. The computer is like an insistent and demanding child: do it my way or I will not work at all. Students quickly pay attention to the difference between upper and lower case, between marks of punctuation. Students with spelling problems learn that they need a dictionary to check when the computer indicates a word is misspelled, but the computer cannot give the correct spelling.

The greatest benefit of using the computer in our program has been for students individually. Our room is open to all students on campus for word processing. Aafter having completed one or more freshman writing courses, students come back on their own to do papers for their other classes. These students have taken in the computer as a writing instrument, a skill which will serve them all of their lives, both personally and professionally.

Our goals are modest, but going the route we have chosen has other benefits, we believe, over adopting a commercially written program. When a teacher learns enough about the computer to develop his own materials, those materials are never going to be in a fixed unchangeable form. The teacher might not be able to modify a commercial program to fit his need, but if he has developed his own materials, those materials can be changed at any time, because the teacher will know how to change them. Our final individual teacher programs will be worth the wait.

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to help each teacher develop ways of using the computer to best incorporate the individual teacher's ideas and methods about the teaching of writing. Second, we want to help students become so used to using the computer for essay writing in the freshman writing courses that they will continue to use the computer for other writing courses and for writing during the rest of college. (Even if they drop out of college, as do many of the students in developmental writing, they will have learned a job skill as a by-product of freshman writing.)

One great problem in freshman writing is the proliferation of rhetorics, readers, handbooks, and workbooks. Now that the computer has become available on many campuses, the influx of word processing programs, textbooks on computer, etc. has begun. Luckily for us, most of these computer aids are written for PC's, not mainframe computers. Our faculty are not tempted to waste their student's time having them learn Company X's word processing program; instead our students learn a major word processing program which is used in businesses -- Digital's *Allin1 Office Management System* has forty percent of the major business market.

At Buffalo State each teacher will be developing his own computer materials, designed to meet individual problems. As teachers learn how to write and store insert files for specific writing problems, the number and diversity of files will grow. Over a number of semesters, the teachers will be able to create a number of re-usable insert files. Probably, there will be much sharing of files among teachers, but each teacher will probably edit each gift file to give it his own teaching voice. One goal of this program is to have a terminal in each individual office, so that each teacher can teach a "paperless" class, using the MAIL facility to transmit essays between student and teacher.

Evidence of Program's Effect

Ideally, each teacher who wants it should have a computer classroom. To achieve that, we would need six computer rooms the size of our present one, and these six room would be scheduled forty hours per week. This will never happen, so the teacher who likes to teach his writing classes in the computer room can do so only by scheduling his classes early in the morning or late in the afternoon. Still in this first year of use, several teachers have been able to hold many of the writing sessions in the computer room. Many teachers like teaching on the computer. As for our students, they too seem enthusiastic.

Students can use the computer as a note pad to list ideas when planning to write on a topic. With the ideas listed, a system of priority on organization can be thought out. Then, leaving these ideas on the screen, the student can begin to compose, referring back to the top of the file for his ideas. Students who have learned to compose at the terminal find it easier and quicker than writing by hand at a desk. For one thing, they can read what they have written. For many students, their handwriting is so poor that they cannot tell when they have misspelled a word or mispunctuated a sentence. Their periods and commas look alike, as do most capital and lower case letters.

In addition, the computer instills discipline and carefulness. The computer is like an insistent and demanding child: do it my way or I will not work at all. Students quickly pay attention to the difference between upper and lower case, between marks of punctuation. Students with spelling problems learn that they need a dictionary to check when the computer indicates a word is misspelled, but the computer cannot give the correct spelling.

The greatest benefit of using the computer in our program has been for students individually. Our room is open to all students on campus for word processing. Aafter having completed one or more freshman writing courses, students come back on their own to do papers for their other classes. These students have taken in the computer as a writing instrument, a skill which will serve them all of their lives, both personally and professionally.

Our goals are modest, but going the route we have chosen has other benefits, we believe, over adopting a commercially written program. When a teacher learns enough about the computer to develop his own materials, those materials are never going to be in a fixed unchangeable form. The teacher might not be able to modify a commercial program to fit his need, but if he has developed his own materials, those materials can be changed at any time, because the teacher will know how to change them. Our final individual teacher programs will be worth the wait.

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TARRANT COUNTY JUNIOR COLLEGE NORTHEAST CAMPUS

HURST, TEXAS

In this multi-campus community college the English Department computer program for developmental, freshman composition, and sophomore technical writing students provides computers in classrooms as well as in labs. Each classroom is equipped with thirty-two stand-alone Macintosh SE computers, eight printers, and MacView, a liquid crystal display. Software includes MacWrite, MacProof, and department-developed templates and excersises. This program complements a writing-as-process curriculum.

Building the Program

In the Northeast Campus English Department of Tarrant County Junior College, we decided not to let technicians have all of the technology on campus. If computers can benefit writers, computers can also benefit English students and their teachers. Furthermore, a department that enrolls more than 4,000 English students in fall semester alone needs diverse methods for teaching them.

Students explain best why we developed a computer-assisted writing program. After taking our English course with computers, Laura Hearn wrote, "Students would probably make better grades if all classes could be taken on computers. It was always more fun as a child to play on my grandfather's old adding machine or typewriter. Maybe a spark within us is triggered when we sit down at a keyboard and face an electronic screen. We begin to play. Thoughts dance in our minds. Computer writing is just more fun." Not only did we want our students to have the fun of writing on the computer, but we also wanted them to have the obvious practical advantages.

In the fall of 1986, ideal conditions for a computer-assisted English program existed for us: (1) We learned from administrators that the District was receptive to a department coming forward with a plan for incorporating computers in its instructional program. (2) We had studied other department's successes and failures with computers. (3) We were discovering easy-to-use word processing programs that would allow us to teach writing rather than computer technology. (4) We had faculty support and the desire to create an ideal computer classroom for teaching writing. (5) We hoped to tap bond money available for equipment.

All members of the English Department participated in a five-week training course in the spring of 1987. A committee worked on curriculum development for computer-assisted composition classes and reviewed software. We wrote a proposal, which the District approved, for a classroom with computers. By the fall of 1987, we opened the first computer classroom in a three-campus district. It has thirty-two Macintosh SE computers and eight Imagewriter II printers for students, and a liquid crystal display unit for the instructor. Software includes *MacWrite* (a full word processing program with easy-to-use commands) and *MacProof* (an editing program to help students identify common errors). The classroom gives first-semester composition students 100% access to a computer during class. Over 410 students enrolled in thirteen sections of computer-assisted writing classes taught by six full-time instructors.

Evaluating and modifying the fall composition course in the spring of 1988, we repeated and filled thirteen sections again. Studying software available for developmental and technical writing students, we wrote a proposal approved by the District, for a second computer classroom to be interchangeably used by developmental and technical writing students. For the fall of 1988, we have thirteen sections of computer-assisted Composition I scheduled in one computer classroom, and we have seventeen sections of developmental English and four sections of technical writing students rotating in and out of the second classroom.

Our Program

We based our decision to offer computer-assisted courses on the following tenets: (1) Computers should not be segregated in labs and offices; they also belong in classrooms. (2) Since technology has changed the way people write, English composition students and their instructors should have access to computers. (3) Although all composition students, indeed all writers, benefit from word processors, developmental and technical writing students especially gain with computers. Learning word processing raises developmental students' self esteem and prepares technical writing students for their roles in business and industry. (4) Since students relate composing on a computer to advancement in their careers, they can see added value in English classes with word processing.

Using conferences and writing-as-process methods in our student-oriented approach to writing, we have discovered that the computer classroom has multiple pedagogical benefits: (1) With classroom computers, we place more focus on student writing. Instructors spend more time working individually with students because computers reduce the need for lecture time. (2) One-on-one conferences at a computer allow immediate changes on a student's paper without any red marks from the instructor's pen. (3) A computer classroom facilitates a writing-as-process approach as students work through prewriting, invention, revision, editing, and proofreading. (4) Students willingly make significant changes in their manuscripts--changes that allow them to experiment and quickly improve the quality of their work. (5) Software editing programs give students immediate feedback on their work, helping them to avoid pitfalls that weaken their writing.

At registration, all Composition I students see an English advisor. Any student with an acceptable score for entry into Composition I on the English Placement test qualifies to take the computer-assisted version.

We require no knowledge of computers, but explain that knowledge of the keyboard is desirable although not a prerequisite. We particularly want to make computers available to students who would not otherwise have access to them for writing.

Introduced to word processing at the beginning of the semester, students learn *MacWrite* and generate a series of paragraphs. Next, they move to templates for prewriting exercises before gathering data for the first multi-paragraph paper. After students have entered their first paper, they learn *MacProof*. Then they are ready to repeat the process by writing a series of papers interspersed with conferences and peer evaluations. This system works best if the student works at the same pace. Instructors help students having trouble with assignments, and students who get ahead help classmates catch up.

When students enter class, they pick up handouts at the counter and check the board for their in-class and homework assignments. Since students are usually engaged in producing documents, they prefer brief individual attention from their instructors rather than even the shortest lectures. As necessary, instructors demonstrate new concepts and enlarge samples of student work with the liquid crystal display.

Outside of class, students read, do research and grammar exercises, write rough drafts, revise or edit hard copies that they print in class, and use available computers.

When classes end in the computer classroom, computer-writing teachers hold office hours in it, and students from any of our computer English classes can come in and work on assignments. When the classroom is unavailable, students can schedule one of the computers in the Computer Learning Center.

The Program's Effectiveness

In studying the effectiveness of computer-assisted writing classes, we gathered data from over 1,600 students enrolled in fifty-five sections, comparing forty-two sections of regular English and thirteen sections of computer-assisted English in the fall of 1987. We based our evaluations on seven sources: MAPS testing, an attitudes survey, completion rates, course grades, appraisal of instruction, student testimony, and faculty responses.

At the beginning and the end of the fall 1987 semester, Composition I students in all English sections took the two-part, twenty-five minute College Board's "Written English Expression Placement Test" (MAPS test). On the average, students in all sections improved their scores with no significant differences existing between students in regular or computer-assisted English classes.

Taken with the College Board Test, a nine-item attitudes survey, developed by the English Department, revealed to what extent student attitudes toward writing changed in regular and computer-assisted classes. In some instances, students in both groups were identical. For example, with the post-test, 44% in both groups called writing for self expression and personal satisfaction "valuable" and 11% in both groups called such writing "essential." In the regular class, 47% on the pre-test and 50% on the post-test "liked" the content of Composition I; however, the responses remained unchanged for computer-assisted students: 62% "liked" the content on both the pre-test and the post-test. Students in the computer sections have somewhat better images of themselves as writers: 78% of the regular students as opposed to 82% of the computer-assisted students rated themselves as "average," "good," or "excellent" writers at the semester's end; other options were "fair" or "poor." At the end of the course, 36% of regular students and 62% of computer students thought personal computers were "great" whereas 37% of regular and 56% of computer students thought that word processing on a personal computer was "the best way to write." (Students in regular classes had access on their own time to computers in the Computer Learning Center).

The computer-assisted course had no significant impact on completion rates. Approximately 66% of the students completed the regular and computer-assisted versions with A, B, C, or D grades. Students in regular and computer sections dropped for the same reasons, primarily not enough time to do the course work.

As with test scores and completion rates, grade distributions were basically the same for regular and computer-assisted English students. On the average, 11% of our Composition students received A's, 27% received B's, 21% received C's, 7% received D's, 19% received F's, and 15% withdrew.

Students ranked instructors with a two-part instructional appraisal instrument. On the nine-part objective portion, the full-time instructors teaching the computer-assisted classes scored slightly higher than their counterparts. All six instructors received higher evaluations from their second-section of the day, indicating that faculty experience in the computer classroom improved performance.

On the subjective portion of the instructional appraisal, students wrote anonymous, handwritten comments that were saved for the instructors to see after they turned in grades. The following samples illustrate random comments from one instructor's classes: (1) "I liked the way we can do our own thing on the computer but get help when we need it." (2) "I am enjoying this class very much. I would also like to have a Composition II class with computers." (3) "We had time to learn how to work the computers and were not rushed." (4) "Gives time to work on the computer. Doesn't waste time with boring lectures." (5) "I learn in this class." (6) "[The instructor] was not hovering over my shoulder every minute. We knew when the assignment was due, and [the instructor] let us take it from there with periodic checks to make sure we're on the right track." (7) "I enjoy this class because learning on and about the computer is very interesting." (8) "This class is perfect!"

Towards the end of the semester, students had opportunities to review their computer-assisted composition class. Primarily, their voluntary comments fell into three categories: the use of computers, the process of writing, and the course in general.

Students commented favorably about the Macintosh SE computers: (1) Laura Hearn: "I was reluctant to take the English Composition I class on a computer because I knew absolutely nothing about the wonderful whiz machines. I was completely taken by surprise when I found out just how easy they were to use. I thought that learning and remembering how to use the computer would be the hardest part of the course for me, but after the tour of the Macintosh, I was ready to roll." (2) Melissa Holbrook: "The Macintosh SE has been the easiest computer to run that I have ever worked with. The commands are easy and simple to remember. The Macintosh SE makes the Apple IIe look like a prehistoric monster." (3) Suzanne Reed: "What I liked most was the opportunity to work with the Macintosh SE. Typing in brainstormed ideas at the touch of the keys, *MacProofing* the entire paper, and printing out a refined copy are just a few advantages. I can honestly say that for once I did not have writer's cramp!"

A majority of students commented on the changes in their writing habits and attitudes toward writing. (1) Anjonette Saint: "Since I have been in this English class, I have learned more about writing than any other English class. The reason is that I can now spend more time working on what I say than the mechanics. *MacProof* is the neatest thing invented since paper clips. There are no more red marks for punctuation and spelling." (2) Marvin Manning: "Although a microcomputer will not make a poor writer a good writer or generate ideas or find a thesis, it helps with productive outlining and brainstorming." (3) Scott Cagle: "It's no wonder most writers are now using word processors. Once you learn the basic operations, practice with processors makes writing a simple task, much more effective than the tedious pen and paper rituals used in the past. Now it's easy to correct errors, copy, print, set the format, and rearrange text." (4) Carla Williams: "I found using the computer a major asset to my writing. I get frustrated easily when I am writing on a piece of paper and I look at my paper and see how many times I have scratched out sentences. It is really frustrating to look down and see that the majority of my paper has been my mistakes or rotten ideas. Using the computer I did not have to look at my messy paper and get discouraged. If I did not like something I wrote, I just deleted it. The computer also allowed me to expand my writing. Ideas just seemed to flow through my head as I experimented with bigger sentences and different words that I would normally not have used. I think typing on the computer made me more daring and willing to try different things." (5) John Stine: "What I liked most was the feeling that I had finally entered the computer age. Seeing my words flash on the screen as fast as I can type them gives the impression that what I write is important. I like the way the computer gives a smooth final copy, proofread and smartly printed."

Overall, the students agreed that the computer-assisted writing course was beneficial: (1) Cynthia Abston: "In my computer-assisted writing class, I liked the personal touch. My instructor was always in class and willing to help me with each individual assignment. I was able to relax and not feel that I needed a Ph.D to understand or to ask questions." (2) Jack Lipps: "Having enrolled in this class twice and having experienced both methods of teaching it, I wholeheartedly recommend that it be taught with word processors." (3) Mary Palmer: "What I liked most about the course was that I was introduced to a new method of writing. Even though I use a computer daily at my job, I never actually compose anything. All of my word processing duties consist of copying someone else's work. By using this computer I have learned how to brainstorm. The ability to quickly insert, delete, or move words, sentences, or even paragraphs leaves room for my imagination to take over. During the process, I can edit what I have written until I obtain the desired product." (4) Tamara Bowser: "I thoroughly enjoyed the informality of this class. This class always ended too quickly--I wish all of my classes went by so fast." (5) Jeff Ward: "The only bad thing about this class is that you become spoiled. Going back to the typewriter will be like going back to cooking on an open flame."

Faculty responses were as enthusiastic as student responses. All faculty teaching computer-assisted composition volunteered to teach it in the spring of 1988. To move from a classroom with chalkboards, an overhead projector, and occasional media setups to a classroom with thirty-two students interacting with thirty-two word processors was a heady experience. We felt like captains of space shuttles taking students on initial voyages. The students were using methods that they had never used as writers, and their elation provided career high points for us. Furthermore, we received better writing, and the final products had a uniform professional appearance.

Certainly, we had to work hard, but we always do as teachers of writing. We had to be prepared and organized (we met in committee to develop lesson plans and to work on classroom procedures). We had to arrive early for class and to leave late because we needed extra time with students in the classroom. We had to do menial chores, such as shutting off computers or fixing paper jams in printers. Mostly, we had to have abundant patience with students who had to follow both writing assignment directions and directions for using the software and hardware.

The Northeast Campus English Department sees computer-assisted instruction as an option--one more method in a bag of tricks for helping students learn. Right now, however, computer-assisted writing is the best trick in the bag, and we believe in its potential.

We will continue to develop computer-assisted writing programs for our students. We are currently documenting our activities so that we can train more teachers--including part-time instructors--to teach in our computer classrooms. Just a few years ago these classrooms were only dreams, but now our dreams have come true, and we have not been disappointed.

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TEXAS TECH UNIVERSITY
LUBBOCK, TEXAS

The English Deaprtment at this multipurpose state university houses two microcomputing facilities. A twenty-six unit island modular classroom with IBM PS/2's is available for basic writing, freshman composition, and technical writing courses, using IBM Write and other software. A networked technical writing production lab has fifteen Macintosh Plus computers, Imagewriters,and a Laserwriter for advanced technical writing and editing classes. The lab offers a wide variety of software including Microsoft Word, PageMaker, Thunderscan, and others suited to work in word processing and document and graphic design.

To describe an institution's program for using computers to teach college writing is to offer only a snapshot, a picture likely to change with technological and theoretical advances. Even as this description was being written, the twelve-computer Microcomputer Learning laboratory that has served the English Department for the past five years became a twenty-six unit Microcomputer Classroom, and thus, Texas Tech has entered yet another new phase in using computers to teach composition.

A discussion of computers and college writing at Texas Tech falls more or less naturally into three parts: a history and description of the Microcomputer Learning Laboratory, an explanation of the new Microcomputer Classroom, and a description of the Technical Communication Production Laboratory. For each, a description of typical use will be included. First, however, some background about the University and the Department of English is in order.

Texas Tech University, located in Lubbock, has an enrollment of more than 23,000 students. Despite its name, the university has always been a multipurpose state university with a full range of program offerings at both undergraduate and graduate levels, including schools of law, medicine, nursing, and allied health.

The Department of English offers B.A., M.A., and Ph.D degrees with specializations in both literature and composition. Each semester, over 4,500 students enroll in one of three freshman composition courses--1300, a remedial course for students with marginal verbal aptitude scores, 1301, which emphasizes rhetorical modes of exposition, and 1302, primarily for the study of persuasive writing and methods of research. Upper-division and graduate courses in composition are offered as well. An additional 800+ students enroll in several undergraduate and graduate courses in technical communication.

The primary purpose of the writing curriculum is to teach students to read and write discourse appropriate to academic and real-world communities. Our program is primarily based on the premises that writing and reading are related developmental processes and are both modes of learning and ways of making meaning. Students benefit from reading and writing experiences that encompass a broad range of purposes and audiences, and those same experiences provide the most effective context for teaching writing skills. Further, we regard writing as a recursive, integrated, and overlapping process involving significant planning, drafting, and revision.

We see the use of computers as support for our premises about writing and our approach to teaching. In particular, computers provide the following benefits to teaching composition, in that they:

- encourage treatment of writing as recursive because they allow for easy invention, drafting, and revision;
- provide computer literacy skills that students need for other courses and for the outside world;
- help students produce more polished and attractive text, which gives them more pride in their work and an improved attitude toward writing;
- allow students to take advantage of the wealth of available software designed to help them write better, including invention heuristics, spell checking, style analysis, and graphics packages;
- offer opportunities for collaboration among students and between student and teacher so that all can work together to produce documents, which can help improve students' reading and critical skills;
- are enjoyable and challenging to use, with the result that writing is motivating and fun for students.

All students enrolled in English courses at Texas Tech have access to microcomputing facilities. In addition to the departmental facilities, the Advanced Technology Learning Center in the University library houses IBM and Digital Equipment Corporation (DEC) mainframes and classrooms with various models of microcomputers. The English Department has recently strengthened its commitment to computers and word processing by providing all tenured and tenure-track faculty members with computers.

The Microcomputer Learning Laboratory

The English Department's Microcomputer Learning Laboratory (the Microlab) dates from 1983, the result of a $20,000 departmental Special Equipment Request grant. Its impetus was a new chairperson's desire to modernize the Department by improving both the writing program and the Department's access to and use of computers. An Ad Hoc Committee on Computer Usage was charged with assessing the Department's computer needs and space requirements and with choosing hard and software. A member of the committee also received a grant to visit Colorado State University to observe the microcomputing laboratory there. The Texas Tech Microlab officially opened for use in September 1983, in an English building classroom adjacent to the Department's Writing Center.

Since the Microlab's first semester (Fall 1983), several faculty members have chosen each semester to offer sections as "computer-assisted." Students enrolled in those sections are asked to purchase a "Microlab User's Kit" (about fifteen dollars), including a User's Card, a pamphlet outlining use of the computers, and a floppy disk. Those students also have reserved access to the computers at least two hours per week. Scheduling is facilitated via a large grid on the wall on which students indicate their reserved times, and students and faculty may use the computers at other times as space is available. To use the walk-in lab, students are asked to bring their University picture identification cards, which are clipped to a User's Card to indicate the software checked out. A log sheet also keeps track of who uses what computer and for how long. The log thus provides a valuable record of Microlab use, important for program evaluation and planning. Staffing for the Microlab during the first semester included one half-time student assistant and twelve faculty volunteers. Later, through funds generated from the sale of User's Kits (the lab is 90% self-sufficient), several part-time student assistants or work study students were added to staff the facility.

Originally, the Microlab housed nine Digital Rainbow 100 computers (each with 64K bytes of RAM and two disk drives) and three DEC printers. The Department purchased the word processing software *Select* and *Grammatik*, a program for stylistic analysis. Dr. Thomas Barker, the coordinator of the Microlab, also wrote the programs *Comment*, which adapted *Grammatik* to composition teaching, and *Setup*, which adjusted *Comment* to various teaching goals.

In the fall of 1986, the Microlab received funds to purchase three IBM microcomputers and an additional printer. *Freestyle* and its spell checking software replaced *Select* and the stylistic analysis packages. Dr. Barker also wrote a program called *MGE* (for major grammatical errors) to allow faculty to identify online such errors as faulty parallelism and tense shifts on students' documents or to allow students to review explanations about those errors and how to correct them.

By the fall of 1987, ten sections of freshman composition or technical writing (as well as an occasional literature course) were taught as computer-assisted, involving approximately 250 students. The lab could be reserved for class use on occasion and instructors could prepare disks for individual students or classes.

Dr. Betsy Jones' use of the Microlab for English 1301 represented a typical situation. Dr. Jones' goal was to use computers to facilitate students' invention, drafting and revision techniques, as well as to encourage collaboration and hands-on computer operation.

Students were asked early in the semester to purchase the Microlab User's Kit, which they took to the lab to run the *Freestyle* tutorial. During the second or third week of classes, after they had had experience with the tutorial, the students met for one class period in the Microlab (which had been reserved for their use). The assignment for the day was to revise a paragraph for unity and sentence clarity, topics discussed previously in class, as well as for spelling. After typing in the faulty paragraph, student groups of two or three working at each computer used the spell checking program to identify misspelled words. They corrected those words and removed or revised sentences that affected paragraph unity. They also gained experience in changing format, such as spacing, centering, indentation, and using underline and bold face. When they were satisfied with their final product, students printed and turned in their paragraphs.

Throughout the remainder of the semester, students wrote six essays, all of which employed multiple typed drafts. Early in the semester, Dr. Jones encouraged her students to write out their drafts in longhand, as they were accustomed to doing, then to type and revise the drafts on the computer. Later in the semester, she suggested that they use the computer to brainstorm and freewrite and to use the computers directly for drafting their essays. In that way, they could take advantage of the computer's ease for inventing ideas and rearranging and revising text. Students then printed out preliminary and final copies that they turned in.

From the very beginning of the Microlab, students have responded favorably. In one attitude and use survey, over 75% of the users indicated that they would choose a computer-assisted English course over a non-computer-assisted one. Students appreciated the training in computer use and word processing and recognized its value in their professional development. We have definitely observed that our students have grown more knowledgeable about computers in the last five years. Many students now arrive at the University with their own computers and frequently very sophisticated equipment. Although those students were less likely to use the Microlab, even when they enrolled in computer-assisted English sections, they often served their peers as excellent computer tutors.

The Microcomputing Classroom

During the summer of 1988, the present Microcomputing Laboratory will more than double in size; *in its place is a fully-automated* computerized classroom, specifically designed for writing instruction. The current classroom was enlarged to accommodate the twenty-six new IBM PS-2 model 25 microcomputers and seven near-letter-quality printers. Each computer has memory of 720K, two 3 1/2" disk drives, and a mouse. Software ordered for the laboratory includes *Microsoft Windows*, *IBM Write*, *IBM Paint*, *IBM Card File*, and DOS 3.3. The new laboratory has an island-modular arrangement and a transparent monitor projection screen to allow students to see the instructor's computer (an IBM Model 50 computer with a 40MB hard disk). The classroom, reserved for class use from 8 a.m. to 4 p.m. and open for walk-in service until 9 p.m., is staffed by students trained in computer use. Students buy an instruction packet at the Texas Tech Bookstore (for under ten dollars). Instructors have the option of using one of the available programs (on floppy disks) or requiring students to purchase one of the many available low-priced word processing packages. Future plans call for the installation of PC network in the room.

By tapping the fullest potential of the computer, the new classroom will immediately benefit the students enrolled in computer-based classes, helping them master the elements of planning, drafting, and revising their papers and providing them with invaluable computer skills. Whereas in the past, time and software constraints meant that the lab was used primarily for word processing and stylechecking, the new arrangement allows students to use the computers as tools for discovery--a way to explore a broader range of purposes and audiences. The classroom, used for ten sections of English during the Fall 1988 semester, allows for a wide range of activities. For example, an instructional sequence based on a recursive model of writing instruction can be implemented, using invention heuristics.

Furthermore, the classroom offers significant research potential. Comparing experimental and control groups will indicate the overall effect of computerized instruction on student performance. Other projects are underway that will consider the effect of demographic variables such as age, sex, aptitude test scores, and computer experience.

Dr. Fred Kemp is using the new classroom to teach developmental writing courses. Although he acknowledges the benefits of using the computer for grammar exercises, word processing, and stylechecking, Dr. Kemp points to more powerful and effective uses of the computer-based classroom. First, cognitive-based instruction using invention heuristics employs interactive questions that assist students in the discovery process. Answers to questions become early drafts of students' work. Such techniques are especially beneficial for inexperienced writers (including those in developmental courses), and as they gain confidence in their work, students tend to internalize the invention process.

A second use that Dr. Kemp will employ is collaborative-based. It is a means of exchanging text between students for peer review, editing, conversation, and even multiple conferences. Such a technique allows for parallel (as opposed to sequential) processing of information. All twenty-five students in the classroom may send and receive information simultaneously. The transcripts generated from such student conversations and conferences provide both heuristics for further student writing and a wealth of material for research. The collaborative-based model of instruction ideally relies on computers networked together, which those at Texas Tech are not at present, yet disk exchange can simulate the peer conversation and review process.

Dr. Kemp primarily uses software he developed or helped develop while at the University of Texas. The six programs include a simple word processor, an outliner, an invention heuristics package, a file management system, and a communications program.

Dr. Thomas Barker, the Microcomputing Classroom director, uses the facility for writing-intensive classes in professional report writing. His students work with on-screen outlining and invention techniques. Other instructors use for college rhetoric classes the new, low-cost word processing packages now available from textbook publishers, several of which include an online writer's handbook.

The Technical Communication Production Laboratory

First opened for the Spring 1987 semester, the Production Lab originally housed eight Apple Macintosh Plus computers, each with an 800K external drive. One computer, reserved for faculty use, was also equipped with a 20MB hard disk. Three Imagewriter II printers and one LaserWriter Plus were connected via an

AppleTalk networking system. During the Spring 1988 semester, six more Macintosh Plus computers, an Imagewriter II/LQ, and a second hard disk were added to the English building classroom.

Software currently available for student check-out includes *Microsoft Word* (currently 3.02), *MacWrite*, *MacPaint*, *MacDraw*, *PageMaker*, *ThunderScan*, and other assorted graphics packages and clip art. Immediate future plans call for a second hard disk, a second LaserWriter, and additional software.

The lab is used only for senior and graduate level technical communication classes, including editing and manuals production. Students enrolled in those classes pay a ten dollar lab fee, which entitles them to check out software and the room key from the departmental secretary and to use the printers and paper. The lab operates on an honor system in that it has no regular staff (although faculty are frequently available for consultation and many students are themselves exceptionally knowledgeable about the computers and software). With the expanded fifteen-unit size, the lab has frequent class-time use, and students use it at other times (the lab is open until 4:30 p.m. weekdays) for assigned writing, graphics, or editing projects.

The goals of the Production Laboratory are to ensure that all Texas Tech Technical Communication majors receive training in word processing, graphic design, and computer graphics. They should also experience the "feel" of using professional equipment and software, to better prepare them for real-world work situations. Furthermore, by using the lab equipment, the quality of student work is significantly increased. Students can produce camera-ready copy that simulates typesetting--documents far more professional in appearance and technique--which further enhances students' preparation for the workplace.

One course that has used the Production Laboratory since its opening is Dr. Carolyn Rude's Technical and Professional Editing class. Among the assignments that Dr. Rude gives her students for the computers are projects in copyediting, substantive editing, and page layout. Students can transfer documents from an instructor's disk to their own and make editorial decisions and changes--about style, organization, tone, layout, and so forth. To ensure that such decisions are based on considerations of audience and function, rather than on the computer's inherent ease and power to make changes, she requires that students submit reports analyzing the editing goals and explaining their decisions.

Dr. Rude stresses to her students that the computer is a tool. Spelling checkers and proofreaders free students from some copyediting tasks so that they can attend more to substantive editing. Computers facilitate sentence-level revision and document reorganization, and they increase formatting options. The Macintosh and laser printer with their multiple fonts and type styles enable students to produce camera-ready copy (rather than typescripts) for desktop publishing. Thus the computers offer editing students more options for designing functional and professional documents.

Students who have used the Production Lab consider themselves fortunate to have had such an opportunity. They value the computer's power and their own competence in using it, especially in light of the increasingly routine expectation that graduates of technical communications programs have computer expertise. For Dr. Rude, the Laboratory is an extremely effective addition to teaching technical editing, although it has brought additional subject matter to the course.

She hopes to add a three-hour-per-week (one credit hour) laboratory component that will allow time to focus on more sophisticated computer instruction as well as more work in grammar and other areas where students require additional practice.

Conclusion

As we reflect on the progress made in computers and college writing at Texas Tech, we are pleased with our development and our ability to do what we are now doing. At the same time, though, we are frustrated that constraints imposed by budget, space, staffing, and imagination have not allowed us to do even more. In other words, the more we do, the more we hope to accomplish, so that we are developing as our resources and expertise will allow.

Our real sense of the importance of the program is that our students enjoy their work on the computers and thus enjoy their writing experiences more. Further, the computer allows both students and faculty the power to explore more fully the writing process, so that students ultimately can write better. We fully anticipate that, although our program, like others, has improved dramatically over the past half-decade, in another five years we will look back on this phase and our most recent changes as an old photo, but one that has enabled the creation of a large and moving picture.

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UNITED STATES NAVAL ACADEMY
ANNAPOLIS, MARYLAND

The freshman English program at the United States Naval Academy involves every student in two semesters of writing which use all four genres of literature--poetry, drama, fiction, and non-fiction--as a basis for improving writing skills. All students own Zenith 248's with 640K and two disk drives, and have been given copies of PC-Write. Printers are widely available. Some professors use the mainframe to receive and send papers and information, and a computer lab will be available in the English Department in the near future.

How We Got Started

Real interest in word processing began at the Naval Academy with the English Department in 1982, and members of the English Department have figured from the first in long-range planning for computer use at the Academy. We were among the first to use departmental funds to purchase computers (five at first, in a room dedicated to their use), and in 1984 we set up a Writing Center in which computers and printers were available to students. The Writing Center has remained responsible for hardware and software storage and circulation. In 1985 the English Department voted to create a standing Computer Committee to set policies and plans for the use of computers in the Department. In 1986 the Academy required the incoming class to buy computers, and in 1987 every faculty member was provided with a computer. Faculty use of computers has grown steadily over the last five years, and virtually all the administrative work of the English Department is done on computer.

The exploration of the potential of computers and writing is left very much to the individual teacher and student. As more and more professors see the usefulness of word processing in their own work they find ways to demonstrate its effectiveness to students. Help of all sorts is available to both faculty and students from the Academic Computing Center, which runs courses in the use of the ever-growing number of software and hardware products and provides technical aid which runs the gamut from programming to helping the student whose paper has been suddenly erased. The English Department has bought a number of different word processing programs and other teaching tools, and these are available for checkout from the Writing Center. The library's catalogue is on the mainframe computer, and the library has the index to PMLA on CDROM. All in all, we have a very extensive amount of equipment and we're improving all the time in our use of it as faculty find creative applications.

The Department now has a five-year plan for growth in computers and electronic instruction, and has requested a three million dollar budget to carry out its plan. We project having our own computer classroom as well as hardware allowing for computerized display of visual materials in every classroom.

What We Do

The English Department at the Naval Academy is seriously concerned with good writing, and the two-semester Freshman English sequence (or a tested validation of competence) is required of every student. Those who need special help are scheduled for an extra semester of writing, and thus finish the sequence in the middle of the sophomore year. Named "Rhetoric and Introduction to Literature," the course introduces the genres and uses literary selections as the occasion for writing. Virtually everyone in the Department teaches somewhere in this sequence, and we all aim for 5,000 words a semester. The establishment of a Writing Center five years ago, along with a writing-across-the-curriculum initiative (now somewhat in abeyance because of lack of funds) moved both the English Department and the rest of the Academy to a new interest in helping students write well. The Writing Center Director and her staff (members of the Department with reduced course loads) emphasize process and revision, and bring the faculty new ideas at brown-bag lunches and the like. Writing is a subject for discussion among members of the Department, and most are abreast of current theory.

Choice of ways to use the computer is probably as varied as choices of texts, and use of the computer to foster specific writing goals runs along a continuum from "Please either type your papers or write them on computer" to "I'll be taking rough drafts on disk and we'll be in the computer classroom on Wednesday." Process is probably emphasized by most instructors over other methods, and of course the computer lends itself well to such an approach.

There are presently no department-wide requirements for computer use for either faculty or students. We give all incoming students some instruction in the use of *PC-Write* as part of their "Plebe Summer" program. Some of this instruction sticks, but of course students obey the injunction to "read the manual" about as much as anyone else does. Therefore, the instructors who are interested in having students make use of the specific advantages of computers during writing must stress those advantages during class time.

Students in upper-level courses have been encouraged to use computers as well. The Department has several laptops and some students have discovered the ease of taking notes in the library with the computer. Several professors have discussed the idea of a database of notes in upper-level courses which require long projects, and some students have found that useful.

Faculty members who feel comfortable with word processing insist in their classes that the computer's ability to make corrections and revisions easier be explored and exploited by students. They require that drafts be done on disk and use analytical software such as *Grammatik 2* at some stage in the students' writing. Most professors spend about two class periods discussing computer writing as part of a general discussion of revision. Requiring a "brainstormed" paragraph immediately after assigning the paper insures that there will be something for the student to work on immediately. Students can hand in any number of drafts before the final paper. Drafts are exchanged between students in the computer classroom, and teachers and students can discuss methods of making useful commentary. Professors encourage students to share ideas and tricks they've learned to make computer use easier, and at the beginning of the semester professors make some class time available in each class period for troubleshooting. Sessions in the computer classroom, which is equipped with a teacher monitor screen, help in both teaching techniques of revision and in allowing students to work with immediately available help. All students can see a projection, and the teacher can see individual screens on his or her screen.

The proliferation of hardware makes possible assignments on the computer itself. One professor has required that his students run a program on literary terms, and take a self-test at the end of the program. Student commentary becomes possible in a new way; students exchange disks and write comments on each other's drafts. Students can " hand in" papers or drafts on a hard disk, and other students or the professor can read their papers on disk or hard copy. All this interchange promotes the notion that good writing is very much a matter of process and revision.

Students use their own computers as well as the following equipment: 640K Zenith, with two drives and color monitor sharing plentiful printers. We distribute *PC-Write* and its manual to each student. Approximately six hours of computer instruction is given to most of the student body.

Each faculty member has a 20MB hard disk Zenith with color monitor, and printer. *PC-Write* is distributed to everyone, and other word processing programs are available for use. These include *Peachtext*, *Microsoft Word*, *WordPerfect* and *Nota Bene*.

Instruction is available for faculty and staff in many different computer applications ranging from DOS to the newest version of *Sidekick*. The Academic Computing Center runs an up-to-date showroom, where faculty can see hardware other than what we currently use.

One quickly sees that choosing a word processing program for an entire student body is a difficult task. This has so far been done with recommendations from all departments, including heavy emphasis on English Department input, in consultation with the Academic Computing Center. The virtue of *PC-Write* is that it is shareware; selecting it obviated the complication of worrying about piracy on anyone's part. *PC-Write* is not easy to learn, however, and there has been a constant search for the perfect program. Presently the word processor of *Enable* is under consideration, since *Enable* comes with the Zenith package and since an integrated package has clear benefits. *Enable's* word processor is simply not as versatile as others, however, and this is something of a drawback.

Two professors have been given an Instructional Development Project grant by the Academy to produce a comprehensive review of educational software--word processors, style checkers, teaching tools, and writing aids. This survey of what is out there and how good it is should show us all what our needs are and should help make some of these tools more widely available.

Reaction

Every informal poll of students indicates that students like using the computer, and that the more they are encouraged to experiment with ways to improve their writing with the computer the more they like it and use it. The single drawback to computer use is lack of typing skills, and students find themselves utterly without time to learn to type.

Faculty members who actively encourage computer use also seem to derive benefits from the use of the computer themselves. Their own writing is an obvious one. Several have adopted one form or another of computer-generated commentary on student papers. One uses "For Comment," a program designed for multiple commentaries on memos, to generate commentary on student papers. Another numbers problems on the paper, and types all commentary into a computer file, keeping a "phrase library" that includes sentences such as "Don't underline your own title" or "Always use the present tense when referring to the events in the novel" that can be inserted into text with one keystroke.

Being something of an enthusiast, I of course believe that the computer has had a tremendous impact on my teaching of writing. I have seen students catch on to the freedom of revision afforded by the word processor and actually change the way they think about writing. The fun of exploring the technology itself is especially great at an engineering school like ours, but I am happy to exploit that in the interest of encouraging good writing. Our students are pre-professional in every sense; they know what their job for the next five years will be. Although they tend to glamorize those jobs a bit, it is clear to those of us in the English Department that students are going to be pushing a lot of paper. Students believe they're going out there to be flyers and technical experts, and they are; but we know, too, that they are going to be junior executives, writing reports and evaluations and keeping up with paperwork. Therefore, we have an important and multifarious task to perform: the uses of good writing must be made clear and obvious to all our students, English majors as well as technical majors. We'll know more about our success in the next few years, as students who have become thoroughly accustomed to word processing and, one hopes, better writers because of it, begin to influence the way that things are done, or at least written in the Navy.

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VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

BLACKSBURG, VIRGINIA

This comprehensive state university offers special computer sections of its freshman writing courses for students who own PC's. In addition, the English Department has a Word Processing Lab which contains IBM and IBM compatible PC's, Apple Macintoshes, and Decmates: two of these machines are linked to MicrosoftWord for word processing; several style, spelling, and punctution checkers (including Author's Analyst, Maxthink, Punctuation and Style, and Rightwriter) are available in the lab for student use.

Virginia Tech is a comprehensive university with approximately 22,000 students. In part because of its history as a land-grant institution, the University has traditionally emphasized programs in engineering, business, agriculture, architecture, and the hard sciences. While maintaining these strengths, the University is now expanding programs in other areas.

Virginia Tech has a sophisticated and well-developed computer system. The Computing Center is built around large IBM mainframes and several DEC VAX systems. Two of the larger IBM mainframes are used to support instructional, research, extension, and administrative services. In addition to the central facilities, a large complement of computing equipment is distributed throughout the campus in colleges departments and laboratories. Over 8,000 of our students own personal computers. Approximately two dozen departmental minicomputers and numerous sophisticated workstation installations serve specialized research programs.

The English Department's computer instructional program involves a Word Processing Lab and special computer sections of freshman English. Also, the Department has offered faculty workshops on computer software programs for instruction and research, currently has a faculty member who has been granted release time to research available software, has made thirty-two PCs available in faculty offices, has a faculty member who reviews instructional software for national publications, and provides computer support for a blind professor.

History of the Program

Virginia Tech encourages computer use for instruction as well as for research and administration. Thus, when the English Department decided in the early 1980's to explore the option for using computers for constructional purposes, it found an audience already informed about computers and curious about their potential for writing instruction.

One of first computer initiatives by the English Department was made possible because, in 1984, the College of Engineering decided to require each entering freshman to own a personal computer (this policy has now spread to other departments). As a result, the English Department was able to offer special sections of freshman English to students who owned personal computers. Since Fall 1985, the Department has offered thirty-one such sections.

The next step in the English Department's computer program was the opening, in 1986, of a Word Processing Lab. Currently the lab provides word processing capability to English Department faculty, graduate students, and undergraduate English majors. In addition, the lab offers instructional software for use by all undergraduate students.

The administrative reaction to the special sections and Word Processing Lab was almost entirely positive. To find the resources necessary to establish our programs, we pursued support by widely publicizing our needs and our willingness to accept donations. We received $5,000 from the University's Parents Fund and a matching gift from the office of the Dean of Arts and Sciences. The Parents Fund goes to support enterprises that benefit large numbers of students. Our request succeeded partly because of the connection between our Writing Center, which serves the entire University, and our Word Processing Lab.

In addition, we received several gifts of hardware from other University departments and from manufacturers. We benefited from our willingness to accept several brands of machines, as well as from our ability to advertise our lab as a place where many students would have access to the hardware and software.

Most faculty members and students reacted to these innovations enthusiastically although some had questions about the appropriateness of computer aids for writing and the mechanics of writing done on word processors. To help clarify the place of computers in the writing classroom, our Composition Committee adopted the following statement in Fall 1985:

Word Processing Use in Freshman English

> Because a number of studies have clearly shown the value of personal computers and spelling, punctuation, and style checkers in the teaching of writing, the Composition Committee endorses their use in all writing course in the Department. Computer use encourages students to make multiple revisions by freeing them from the burden of having to rewrite or retype each draft. The checkers, like a tutor in the Writing Center, raise a student's awareness of typical patterns of error; but, also like a tutor, they do not correct these patterns. The student must still decide what, if any, change should be made.

Relationship of Program in Computer Writing to a General Approach to Writing

The goals of English 1105, Introduction to the Composing Process, our first semester freshman English course, are expressed in its course discription:

> English 1105 is a course in language and its uses. It is designed to increase students' mastery of composing processes and their understanding of the features of effective expository and persuasive prose. The goal of 1105, then, is to develop students' abilities in exposition and analysis so they may respond effectively, in college and after, to a variety of rhetorical situations.
>
> By looking critically at their own writing and the work of established writers, students in 1105 will more fully see that writing is a process that includes planning, inventing, writing, revising, and editing, and that there are various choices to make at each stage in this process, depending on audience, aim, subject, and genre.

As the statement on Word Processor Use in Freshman English and our course description demonstrate, many of our faculty are committed to a process approach to teaching writing. We have found that the use of word processors facilitates a process approach by freeing students from the burdensome mechanical chores that revision once required. Additionally, the use of spelling, punctuation, and style checkers can offer students additional tools in working through drafts. We do, however, advise students that, particularly with style checkers, they should proceed cautiously; we want our students to realize that style checking software offers, for the most part, guidelines, not rules.

Although we have in mind clear goals for our students, as described above, we encourage an eclectic approach to the achievement of those goals. As the strategies section of the 1105 course description says:

> Although the description above is intended as a common goal, the program is flexible about how students might be led to recognize and to practice these methods. That is, the choice of text, subject matter, and readings is up to each individual instructor, as are the particular forms that writing exercises will take. While reading selections will depend on the approach of each instructor, they may include genres such as narratives, letters, journals, and, in the latter weeks of the semester, possibly from short fiction. Whatever the choices, readings will present students with effective rhetorical models for their own writing. And although writing assignments will vary among sections, they will be rhetorical in aim, challenging students to develop an awareness, in both their own and others' prose, of such matters as invention and content, tone and voice, arrangement and style.

Our instructors, then, are encouraged to find those teaching methods that are most effective in helping them reach the goals of the courses. Many instructors use collaborative learning methods, such as peer commenting and editing. We have found that the ease of revision provided by the word processor encourages students to incorporate the ideas they gain from such groups. And, because so many of our students own PC's, we see these gains in many sections, not just the special computer sections.

Special Computer Sections

Since fall 1985, we have offered thirty-one special sections of freshman English for approximately 600 students who own personal computers. These have all been sections of our regular freshman English sequence: a first quarter course, Introduction to Composition, and second and third quarter courses, which emphasizes writing about literature.

In the computer writing sections, students receive the same instruction in rhetoric and composition that other students receive. In addition, however, faculty members also help students become proficient in using their word processing software and various computer aids for prewriting, reviewing, and revising.

The instructors of these sections have found that their students are becoming increasingly sophisticated in using their word processors. One instructor found that, at the beginning of a term, most students compose on paper and then type their work onto a disk. By the end of the term, however, he observed that most of the students were composing on the word processor.

The following is a sample syllabus for a computer section:

Syllabus for English 1122 (PC Section)

Course Objectives:

> At the end of this course you will be able to read for style, imagery, structure, and tone as well as for content. If you're already doing those things (and everyone is), then you'll be able to read more carefully.
>
> You will also learn to write more carefully, and that is practically the only secret there is to writing well other than practice. You will be more aware of your own tone. You will afford your writing more purposeful structure. Where you need imagery, you will be able to choose it more carefully, and you will be well on the way to developing your own style. Finally, you will learn how writing techniques apply to word processing software; you will learn to take advantage of the editing apparatus available to you. With luck, by the end of the term you will have at least turned fear or dislike of writing into reluctance to write, and you will find yourselves more comfortable with writing.
>
> All essay and entries will be handed in on diskette, formatted for IBM PC (DOS 2.1). With luck, next to no paper will change hands this term; I want you to accustom yourselves to writing, receiving comments, and editing at the word processor.
> (Syllabus also includes texts, requirements, and calendar.)

Description of Hardware and Software

In addition to the computer resources owned by the University and by individual students, the English Department Word Processing Lab contains six IBM PC's, three Leading Edge machines, six Apple Macintosh machines, and two Decmate II machines. One of the IBM PC's is linked to the mainframe system. For printing, we have a Corona LP-300, and Apple Imagewriter, an Epson, and two Digital printers.

Available word processing software includes *Macwrite* , the *Decmate Word Processor*, the *Leading Edge Word Processor*, *Microsoft Word 3.0*, *PC Write 2.7*, and *Volkswriter 3.0*.

In addition to word processors, the lab contains *Author's Analyst*, *Leading Edge Speller*, *Maxthink*, *Microspell*, *Punctuation & Style*, *Rightwriter*, and grammar tutorial programs from Intellectual Software, Inc.

During the summer of 1988 a faculty member was given course equivalent release time to investigate additional available software and make purchase recommendations. He looked at tutorial and checking software for students in regular and developmental writing courses, and will be helping the Department make decisions about new acquisitions.

The Effect and Importance of the English Department's Computer Program

Partially as a result of English Department initiatives, students and faculty are continuing active use and investigation of available software writing resources for computer writing courses. With students from several majors now being required to own PC's, the clientele for the special sections should expand.

In Fall 1988, the Writing Center, the English Department's tutoring service moved to a room adjacent to the Word Processing Lab. As a result, Writing Center tutors now have additional opportunities to refer students to computer resources.

We have observed that the comparative ease of word processing encourages students to revise more fully and frequently than they do when they must use more laborious methods to produce drafts. We are also impressed by the help computers can offer students through prewriting aids and checking software. These aids help students become increasingly self reliant and conscious of language patterns. Some students have trouble achieving a distance from their work which will let them see language patterns; computer aids can make them aware of these patterns. In addition, when students are able to correct problems with surface features on their own, faculty are able to spend more time focusing on larger issues of writing effectiveness.

We have been fortunate to be able to draw on the technological strength and emphases of the University in developing computer-related writing programs. We plan to continue to take an active role in investigating and implementing computer aids for teaching writing.

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GEORGE CORLEY WALLACE STATE COMMUNITY COLLEGE

SELMA, ALABAMA

This initiative in computer writing at a small state-supported community college focuses on freshman composition and business communication courses but also extends to sophomore courses in literature. The initiative is served by a computer science laboratory which houses forty IBM (PC, XT, and AT) computers, about as many Brother (M-1509) printers, and a computer projector. At this time, Perfect Writer, which includes a speller and a thesaurus, is used for word processing, and Right Writer is used for analyzing style.

History: The English Department's New Neighbors

During the winter of 1984, George Corley Wallace State Community College in Selma, Alabama, established a computer science department, complete with a laboratory housed next door to the Department of English. All three of us English instructors complained that the noise would be bothersome and worried that the new lab would soon need our office space. Yet, even as I expressed our complaints and anxieties, probably louder and longer than my colleagues, I admitted to myself that I was excited about our new neighbors and their machines. With computers and computer scientists conveniently next door, I knew that my students and I would eventually be using these computers to write.

The idea that modern computer technology might support the ancient art of rhetoric was not new to me, but the opportunity to make this idea a reality was. I set about learning what I could about computer writing. I attended workshops and conferences, consumed books and tapes, which I had ordered for our library, learned to operate two word processing programs, and consulted regularly with our computer science instructors who, by now, realized that I was serious about using *their* computers for writing.

At times I felt like a pioneer in the wilderness. Even the computer science instructors, who were certainly among the more supportive of my fellow faculty members, left me to my own devices, overwhelmed as they were with the tremendous responsibility of establishing their own department. As for my colleagues in the English Department, they were tolerant of my enthusiasm but clearly disinterested. In their defense, I must note that both of them, in their own way, indicated approval of *my* efforts to initiate computer writing in *my* classes.

Two years after the computers had moved next door, I realized that no one would make me, or even ask me, to use them in my classes. After all, the appearance of my classes in the computer lab would incur scheduling problems, which administrators and faculty alike prefer to avoid. Taking the initiative, however, I was able to negotiate with the computer science instructors for use of the lab. We all agreed that I should reserve the lab for my classes on a daily basis. Also, I was informed that the computer science classes would need the lab every day for the first three weeks of each quarter. After three weeks of spring quarter in 1986, I led my class of twenty-one excited and anxious students into the computer laboratory for the first time. Appropriately, the class was Freshman Composition I.

Freshman, as well as sophomores, react to computer technology in a variety of ways. Many clearly enjoy membership in the new generation, unnerved by the machinery and confident of the convenience afforded by its technology. Still others are less sure, but slowly come to accept the computer as a valuable aid. A few are skeptical, unconvinced that the computer can do anything but get in their way of writing. These few eventually perceive that their way of writing is precisely what word processing on the computer can help.

To my knowledge, I have never lost a student because of the computer, nor have I lost a computer because of a student. My students and I, however, have lost files, floppy disks, and even our peace of mind on several occasions, all in the good cause of computer writing. I recall painfully a particularly bright freshman who patiently entered all 500 words of her text three times, convinced her file had twice vanished and ignorant--by my neglect--of her disk directory. Also, I remember sadly a particularly naive freshman who could not understand--despite my admonitions--why the disk that she had kept crumpled in her purse would not work.

Computer Writing as a Process and a Product

Frustrations aside, my experience with that first class confirmed what intuition and research had suggested earlier: the use of computers enhances the teaching of writing to college students. Computer writing--especially editing and formatting--complements, in a very satisfactory manner, the emphasis I place on writing as *both* a process and a product. Essentially, I teach writing as the process and the product of invention and revision. The process of invention and revision, which leads to a polished product, can often be understood by novice writers in terms of the following four steps: first, choosing a subject; second, analyzing the chosen subject logically to arrive at a thesis; third, developing the thesis into an organized paper; and fourth, using grammar and style. While the first step in the sequence can be classified as prewriting (or thinking without writing), the act of writing (while thinking) begins with the arrival of the thesis at the end of step two. The process of writing as invention and revision from the arrival of the thesis through its development grammatically and with style can be related to word processing on the computer, namely invention through keyboarding and revision through editing. When accompanied by formatting, keyboarding and editing result in a written product.

Now, over two and one-half years, I have taken twenty-nine classes into the computer lab on a regular basis to write. These classes include ten sections of Freshman Composition I, nine sections of Freshman Composition II, seven sections of either World, British, or American Literature, two sections of Business Communications, and even a class in Study Skills, for a total student enrollment of 565. This number, of course, does not represent 565 individuals because many students begin the freshman composition sequence with me and continue through a sophomore survey of literature. At the same time, the extent to which I have been able to introduce college students on this campus to computer writing seems significant.

I teach my classes much the same as I have always taught them with three exceptions. First, all writing assignments--as many as five per class per quarter--are carried out on the computer. Second, the writing assignments themselves now include revisions as well as original papers. Third, any explanation of the writing process is extended to include the three steps of writing on the computer--keyboarding, editing, and formatting--the fundamentals of which I can usually teach in a lecture, a demonstration, and a laboratory.

I explain keyboarding and demonstrate it as a tool of invention, used specifically, within a word processing program, to produce an organized, grammatical, and stylish paper. At the same time, keyboarding is distinguished from typing. Generally, students come to us with some knowledge of typing, but those who do not quickly grasp basic keyboarding skills. While a familiarity with the keyboard can be very helpful, the inability to type does not interfere with the ability to write on the computer. Typing forty to sixty words a minute is an appropriate skill for secretaries--not writers. Generally students come to us with some knowledge of typing, but those who do not generally gain keyboarding skills.

Next, I explain revision and demonstrate it in terms of two basic activities--inserting and deleting, both of which are performed within a word processing program at the prompting of a speller, a thesaurus, a style analyzer, and, most important, the writer's sense of what would be more effective. Finally, I share with students the ease with which a paper can be formatted, within a word processing program, and printed. Writing--as an attainable polished product--has immediate appeal for students.

After the lecture an demonstration, I hold a structured laboratory, allowing students a hands-on experience with keyboarding, editing, and formatting. Subsequent classes in the computer lab provide students individual attention from me as they carry out their writing assignments.

At present, my students have limited access to forty computers (IBM PC's, XT's and AT's) and about as many near-letter-quality printers (Brother M-1509's), located in the Computer Science Lab. To write on the computer, my students use two programs: a word processor with a speller and a thesaurus (*Perfect Writer*) and a style analyzer (*RightWriter 2.1*)

The Effects of Computer Writing at W.C.C.

The effect of computer writing on students seems positive, extending to a wide variety of students found on the campus of a community college--the returning housewife who needs self confidence, the night student who must conserve time, the young athlete who dislikes writing, the slow learner who may have mechanical skills, and the bright English student who needs a challenge. All of these students are grateful for the opportunity to learn and/or to practice computer writing, a skill which they perceive as fundamental and widespread in government, in business, and among the professions. Furthermore, students sense that computer writing has immediate value for them as they come to appreciate the ease with which they can edit and as they come to take pride in the appearance of papers which they format on the computer. One busy sophomore expressed her gratitude and commitment profoundly, "I don't know what I would have done if I had not learned to write on the computer in freshman composition. I have written all of my papers since then on the computer."

The most impressive evidence of any positive impact made by computer writing at Wallace Community College is our plan to establish a writing center with computers and printers. As proposed, the Writing Center will be a laboratory where all members of the college community can either get help or help themselves to become better writers. Any efforts to produce better writing in this center will be all the more effective because of the computers.

The significance of computer writing on our campus--as I sense it--is pedagogical. In other words, computer writing is important because it enables me as a writing teacher to influence my students' attitudes toward, abilities in, and appreciation of writing.

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WAYNE STATE UNIVERSITY
DETROIT, MICHIGAN

Wayne State is a public university which draws most of its 30,000 students from the urban Detroit area. Computers have been integrated into English courses at all levels, from basic writing to graduate seminars. English faculty have Macintosh Computers in their offices and have access to a four-station workroom with two Laser Writer printers. Students use a thirty-five station writing lab equipped with Macintosh computers, Laser Writer and Image Writer printers, MacWrite and Microsoft Word processing programs, and other software. The lab is staffed by graduate teaching Assistants, who provide continuity between the computer lab and the writing program in the English Department.

Background

Wayne State University in Detroit, Michigan, is one of a small number of research universities which are strongly committed to an urban mission: providing high quality education to a largely urban student body, and conducting scholarly research on urban related problems and issues. A major component of Wayne State's urban mission is to be a university of access for students who have had limited educational opportunities. Minority students account for 30% of the student population, and a large number of Wayne State students are the first in their family to ever attend college. Wayne State is a commuter university with little dormitory housing for its 28,000 students, whose average age is twenty-six.

In the mid-1980's, David Adamany, President of the University, made academic computing a high-priority administrative goal with the intention of establishing Wayne State as a model university in terms of access to and application of computing and information technology in an urban academic setting. Responding to the President's mandate, an Academic Computing Policy Committee developed a strategic plan for the University, recommending that Wayne State should provide opportunities for each student to learn general-purpose computing skills as well as the application of computing technology in his or her major field. To this end, the General Education requirements for all students in the University now include a computer literacy requirement, one that encompasses the areas of word processing and text analysis, accessing and processing information, and electronic communication as general-purpose computing skills. This requirement can be fulfilled in a variety of ways: by completing a high school course in computers, by enrolling in an introductory seminar offered by the Computing Services Center of the University, or by taking a number of freshman-level courses designated to fulfill the computer literacy requirement.

As a part of his initiative in academic computing at Wayne State University, the President displayed personal interest in establishing a computers and writing program within the Department of English. To determine the best methods of incorporating the application of computing technology in the area of writing, the Department, in conjunction with the Computing Services Center spent the academic year of 1985-86 planning the implementation of a computers and writing program. During the year, several consultants from the University of Minnesota, the University of Colorado, and Michigan State University presented information about their programs to members of the Department of English. The Department also received authorization to hire an assistant professor who would be responsible for coordinating a computers and writing program. In response to a grant proposal, Apple Computing Corporation donated seventy-three Macintosh computers to the University; the administration of the University then funded the construction of a computers and writing lab and allocated $30,000 in funds for curriculum development in the area of computers and writing, most of which was spent for summer salaries and released time for faculty.

Initial Response to Administrative Goals

Within the Department of English, the initial faculty response toward a computers and writing program was mixed. A small core of enthusiastic faculty looked forward to using computer to enhance the subprocesses of planning, writing, and (especially) revising components of the writing process. A larger group of more wary faculty was unconvinced of the value of computers in the teaching of writing, not believing that the computer would significantly assist in the reading, writing, or analyzing of texts and fearing that the introduction of computers might detract from the teaching of writing by making faculty responsible for teaching the complexities of computing.

This mixed reaction is a typical response to the beginning of many programs in computers and writing. Since the program was initiated by the University administration, which has its own agenda for the use of computers on the campus, the objectives of the administration were not always seen as consonant with the objectives of the Department of English. Further, some ideas about computers and writing within the administration, such as the assumption that the use of computers will result immediately and noticeably in a whole-scale improvement in student writing or the notion that the use of computers might allow larger class sizes and thus fewer composition instructors seemed naive and even threatening to some faculty in the English Department. Thus, a major part of the development of the computers and writing program has been an attempt to reconcile the administration's objectives with those of the Department of English. The intent has been to ensure that the program reflects the Department's focus on the processes of reading, analyzing, and writing texts.

Developing Departmental Goals for Computers and Writing

Over the past three years, the Department of English has successfully integrated computers and writing in a way which is consistent with departmental goals, with the wide-ranging participation of faculty and the enthusiastic use of computers for writing by growing numbers of students. The success of our program has depended upon two factors. First, the Department has made it a matter of policy that the computers and writing program is strictly voluntary. No faculty member is required to write with a computer, yet ever-increasing numbers are doing so. Second, the program has made every effort to secure computers for the business of the Department, including the research, teaching, and service of the faculty members. Currently, the Department has a four station lab for faculty and graduate students; twenty-three individual faculty members have computers in their offices. This integration of computers into the life of the Department is crucial to the success of a program because only by using computers for their own work will individual faculty members be most motivated to use computers in teaching writing to their students. Such an integration changes the focus of a computers and writing program from one begun in response to the University administration to one developed in response to the general goals of the Department.

In its writing classes, the Department of English places special emphasis upon the relationship between academic and/or professional reading and writing, specifically upon readers' expectations about the structure and meaning of written texts; the writes reliance upon previous written texts to produce new writing; and the process of collecting, interpreting, and disseminating information through written texts. In response to these departmental goals for the teaching of writing, the computers and writing program has adopted the following statement of philosophy:

> The chief value of using computers for writing is that they make language and texts more flexible. Experienced writers know that discovering and communicating purpose and meaning in a coherent structure requires constant writing and rewriting in a series of drafts. Inexperienced writers typically do not revise and rewrite; they often have no conception of text as a product of a drafting process. One way to develop students' facility in academic writing is to offer them an easier way of planning, writing, and revising with a drafting process through the use of computers. If writing multiple drafts is not an arduous task, students may be more likely to acknowledge and appreciate the results of using such a writing process. Using computers in this way is consistent with the goals of the writing program in the Department of English.

The goal of the English Department is to develop students' expertise in the processes of reading, analyzing, and writing texts; the related goal of the computers and writing program is to discover the benefits of the interaction of the computer with the writing process by encouraging both the independent use of the lab by individual student users and the integrated use of computers in writing classes.

The main facility of the computers and writing program at Wayne State University is a thirty-five station lab, located in the same building as classrooms of the

Department of English. The lab is equipped with Macintosh Plus computers, Image Writer dot matrix printers, and letter quality Laser Writer printers. Multiple copies of basic software programs are currently available, including *Mac Write* for word processing, *MacProof* for text analysis, and *MacDraw* for creating graphics. Also available are single copies of more specialized software programs, such as *Microsoft Word*, an advanced word processing and desktop publishing program, *Microsoft Works*, an integrated business program, and miscellaneous other prewriting, writing, and revising programs.

From its first day of operation on March 25, 1987, the Department's Computers and Writing Laboratory has been a success with students, who have used the computers for a variety of writing activities, including class assignments, essays, research papers, technical reports, creative writing, graphics, and desktop publishing projects. Student users include undergraduate and graduate students in a variety of liberal arts and science programs, although English majors and students enrolled in English classes received priority access to the computers and sole access to the Laser Writer printers. To assist students in using computers independently, several members of the English Department prepared an *Introduction to the Macintosh Plus* manual. The manual explains the operation of Macintosh computers; tells how to create personal and backup disks; shows how to write, save, retrieve, and edit a paper with Macwrite word processing software; explains how to use the text analysis program MacProof; shows how to create graphics; and provides a glossary of Macintosh terms. Most students, however, seem to prefer more a collaborative approach to learning about computers and writing, asking faculty, teaching assistants, lab assistants, and other students for help when needed. This preference for informal learning may be attributed to the ease of operating the Macintosh computer.

The Computers and Writing Lab is staffed by six teaching assistants, who provide the essential link between the writing lab and the Department's writing program. These graduate students give technical assistance to students working on the computers, but more importantly, they also help students with their writing, especially with regard to the techniques of writing and revising with computers. It has been through the efforts of the teaching assistants that the computers and writing lab has become an environment devoted solely to writing: except for the clicking of keys and the hum of printers, students are engaged in writing, quietly consulting with their peers or the teaching assistants.

After two regular semesters in operation, a cyclic pattern in independent student use has emerged: business in the computer lab begins fairly slowly during the beginning of each term, averaging thirty to fifty students per day, but then builds quickly and steadily; by midterm and through the end of a term, the lab is full throughout its hours of operation, averaging thirty to thirty-five students per hour. Taking advantage of the slower time in the lab at the beginning of each term, instructors bring writing classes to the lab for an introductory demonstration about computers and writing. In a typical introductory demonstration, a teaching assistant includes an overview of computers in general and the Macintosh in particular as well as an introduction to using the *Macwrite* word processing program to create, edit, and print a paper. The introduction also includes a discussion of the advantages of writing with computers, emphasizing the ease of revision with word processing and editing software. During the 1987-88 academic year, the teaching assistants conducted over 100 demonstrations for writing classes, introducing over 2,500 students to the use of computers in writing. In a recent survey, faculty in the English Department praise the idea of introductory demonstrations, commenting that they learn how to use the computers along with their students, which creates a truly collaborative learning situation.

During the past year, faculty in the English Department have integrated computers into their teaching of writing in a variety of ways. All instructors announce the availability of the lab to their students, and most also devote some class time to a discussion of the advantages of writing and revising with computers. The majority of instructors of freshman English bring their classes to the lab for class work on computers, conducting in-class writing, revising, and editing sessions, and developing an interesting variety of collaborative activities for their students, such as paired or group work on papers and projects. Instructors have noticed that collaborative work in the computer lab seems to be appreciated by students; one faculty member reports, "Students often meet in the computer lab before and after class and even on weekends. These computer meetings have in a sense extended our course beyond its regularly scheduled meetings. I believe that students' work in the computer lab has positively affected their work in the class room. Students know each other well and are comfortable talking with each other in the classroom; thus, discussions of readings are lively and group work is productive."

A few faculty members require all classwork to be done on computers. Many instructors ask or require their students to use the computers to write and revise at least one paper, trusting that this experience would inspire students to continue writing with word processing. In general, this proved to be a successful tactic: about half the students in a class continue to use computers for writing, a high average considering the fact that Wayne State is a commuter school and few students have access to off-campus computers.

Faculty teaching writing classes in which assignments are directed towards a cumulative goal, such as a long essay or a research paper, use computers as an essential part of the writing process. Students use the computers for preliminary assignments, such as bibliographies, summaries, critiques, position papers, and drafts; they are then easily able to incorporate parts of their previous work into their final papers. Instructors especially appreciate the opportunity to assign substantive and extensive revisions without worrying about the logistics of requiring full-scale rewrites and revisions of essays or other assignments. One instructor whose students regularly use computers notes, "I got better rewrites; more seriously attended."

Faculty teaching in the Department's technical writing program have followed two directions in the use of the computers. Some instructors are interested in using large integrated business programs. One instructor is now developing an introductory manual for *Microsoft Works*, which combines word processing, spreadsheet, and graphics programs. She reports that her students appreciate the opportunity to learn and use the type of software that will become part of their professional lives in engineering and business. Other instructors are interested in publishing software. One faculty member points out, "Because facility with word processing and page design software is now expected of most professional technical writers, I incorporated introductions to this software in my course design."

One of the newest initiatives of the computers and writing program is its integration into graduate programs within the Department of English. A number of instructors already use the computers for collaborative work at the graduate level, such as composing paired critiques or compiling an annotated bibliography. In the fall of 1988, a graduate-level course entitled "Computers and Composing" will be offered to Ph.D students in composition and M.A. students in professional writing. This theory-based course will consider research issues related to computers and writing, examining the ways in which thinking, reading, writing, and learning are affected by the use of computers.

Conclusion

The most significant effect of the computers and writing program has been the evolution of attitudes within the administration of the University and the Department of English. Three years ago, many members of the administration had a limited view of computers in writing, assuming that the use of computers would create quantifiable differences in student writing. Though communication with the Department of English, mostly in the form of reports on the computers and writing program, the administration seems to have moved towards accepting a qualitative evaluation of the program, one which stresses the benefits of collaborative learning and the uses of computers for planning, writing, and revising texts. An equally important evolution of attitude took place within the Department of English. Three years ago, many faculty members had a skeptical attitude toward the introduction of computers in the Department, fearing that an emphasis on the technology of writing would detract from the Department's broader goals of teaching the reading, analysis, and writing of texts. Today, the faculty seems to have accepted the computers and writing program as an integrated part of the Department, participating in the program by bringing their classes to the lab, encouraging their students to write with computers and experimenting with computers in their teaching of writing.

In general, the effects of our program in computers and writing at Wayne State University reflects the trends nationwide: integrating a computers and writing program has had positive effects in terms of attitudes towards writing and opportunities for innovative teaching . Our program thus provides evidence that computers and writing have an important place in the urban academic setting.

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WEBER STATE COLLEGE
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Weber State, a four-year state college of 12,000 students, supports freshman and advanced writing classes with a tutor-assisted Writing Center and a Computer Center of three systems: the first, two Novell LAN's with generic MS-DOS stations; the second, AT&T microcomputers networked to an AT&T 3B2 minicomputer (both systems offering WordPerfect, Writer's Workbench, and various faculty-created analysis programs); and the third, Convergent Technology IWS work-stations clustered in twelve-station LAN's, with ALPS software for both word processing and stylistic analysis.

History

Weber State College was a pioneer in computer-assisted writing. In 1982 members of the English faculty traveled throughout the country, visiting schools which had initiated such programs. In addition to word processing, faculty were interested in text analysis, such as *Writer's Workbench*. Because that particular program was not commercially available, the College began a collaborative effort with ALPS (Automated Language Processing Systems) Corporation to develop a similar program. The new software was first used when the English Department's Computer Laboratory opened in the fall of 1983.

Participation in the computer-assisted writing program has been voluntary for our faculty, with some more involved than others. From the beginning some instructors included computer-oriented instruction in their courses. Other instructors, because the ALPS system is extremely simple to use, merely introduced students to word processing during a brief, but effective, orientation, leaving the students to use word processing to whatever extent they wished.

In May 1984, Weber State sponsored the Western States Conference on Computer-Assisted Writing, which featured such presenters as Lillian Bridwell, Kate Kiefer, Ruth Von Blum and William Wresch. In October of that year, Weber faculty members presented reports on our system at the National Conference for General and Liberal Studies, and at the Northern Rocky Mountain Research Association Meeting.

Even the earliest students in the program reacted positively. A 1984 research project included administration of the Emig-King Writing Attitude Scale for College students. On the Preference for Writing scale, students using the computer showed significant gains ($p < .01$) while the non-computer students showed no significant changes in attitude.

In fall 1987 Weber State expanded its Computer Writing Center, adding new workstations which use *WordPerfect* and *Writer's Workbench*. In 1988 we also integrated the Center into the College's extensive network of learning centers, and transferred routine management from English faculty to a professional staff. This transfer allows the English faculty to concentrate on pedagogical concerns. Shared use by the entire College of these expensive machines makes for fiscal efficiency. Shared use also advances our writing-across-the-curriculum program: increasingly, the organizational structure of our campus computer centers reflects the growing awareness that teaching writing is the responsibility of all faculty, not just the English Department.

The Computer Writing Center and the Writing Program

Other than a strong Moffett influence on freshman classes, which directs that our students proceed from expressive to transactional writing, our program at Weber State gives individual instructors great autonomy in planning and teaching their courses. English faculty--and those who participate in our writing-across-the curriculum program--agree in theory with the process approach, but vary widely in the extent to which their classroom teaching implements this approach. And they vary too in the extent to which they use the computer to advance this approach. A few instructors do little more than make students aware of the computer. Some instructors request drafts which go through peer and instructor review; others participate fully in their students' development of each assignment, several bringing classes or small groups to the Computer Writing Center for work sessions.

In addition to activities by individual instructors, we teach the writing process and the uses of word processing through our Department's walk-in tutorial center, which is located in the same room as the computer writing facilities. This tutorial center is available to all students and all classes--including those in other disciplines--and is managed by a part-time graduate English major, supervised by an English faculty member, and staffed by undergraduate peer tutors. The emphasis in this center is on intervention throughout the writing process. In their practicum, tutors are trained to encourage students to come in for help early in each assignment and to return for different kinds of help at various stages. Tutors are available, through our Writing Fellows program, to assist faculty with writing assignments in other disciplines. For example, a tutor may attend a sociology class, then meet with students individually or in groups for prewriting discussions and review of drafts.

This year we initiated an extensive remodeling of the physical plant; we hope to provide more space around our workstations, so that collaborative writing, which is currently done with hard copy in the classroom or in the Writing Center, can occur more directly on the computer. We are also adding a terminal devoted entirely to teaching and a small cluster for group work.

Number of Students Involved: The following table, derived from data collected during the last nine weeks of Spring Quarter, 1988, presents the average frequency (number of students) of use during regular hours (0800-2200) Monday through Friday and during the curtailed operating hours on weekends.

	WEEKDAYS								
Hrs. (in 24)	08-10	10-12	12-14	14-16	16-18	18-20	20-21	SAT	SUN
# STs (avg)	42	58	55	48	38	39	34	129	44

Total weekly usage varied from 1,034 students in the second week of the quarter to 2,263 in the next to last week.

A sampling of 216 students was asked to indicate toward which course their writing in the Center was directed. Percentage of academic areas cited is shown below:

English	Humanities	Allied Health	Business	Education	Natural Science	Social Science	Technology
47	7	2	6	6	4	21	6

During peak weeks one quarter of the student body uses the lab, and this usage is well distributed across academic disciplines, with more than half of the writers coming from outside English. Social Science students represented about one fifth of the group, perhaps because the center is located in the English/Social Science Building and is co-located with the Social Sciences Computer Center.

Hands-on computer instruction for whole classes is limited to the first two weeks of each quarter, when we offer a forty-five minute orientation to individual classes. We have over fifty of these each quarter. These sessions primarily introduce students to the machine. After orientation, further instruction is handled individually by the computer assistants on duty at all times.

Our writing tutors are encouraged to master word processing procedures, such as block moves and double screens, so that they may teach these procedures and help students integrate them into their writing process. Tutors are also given information on *Writer's Workbench* so they may help students interpret the analysis, saving valuable class and conference time.

Hardware/Software

Our Computer Writing Center has seventy student workstations of three basically different types. Each time an opportunity arose, we acquired what we considered the best system available at that time. But the uncertainty in funding common to all academic institutions, and a rapidly changing technology in small computers and text processing systems, has made uniformity neither possible nor desirable.

The original lab was developed using Convergent technology IWS workstations, clustered in twelve station LANs, using a file server station and a single 40MB disk. Some software and student document files continue to be maintained on this master disk. As mentioned earlier, word processing and text analysis are performed with software developed in conjunction with *Automated Language Processing Systems (ALPS)*. Both hardware and software in these original stations are obsolete; we will phase them out of operation over the next two years.

The second set of workstations, obtained with the assistance of an AT&T grant, contain AT&T 6300 microcomputers networked to an AT&T 3B2 minicomputer. The 6630 machines support *WordPerfect* text processing. Students may upload their texts to the 3B2 for text analysis by *Writer's Workbench*. Students store their documents on their own floppy diskettes. For text analysis, students call a program which converts and transmits their file to the 3B2 and initiates *Writer's Workbench.*

The third set of workstations is comprised of thirty generic MS-DOS microcomputers and *WordPerfect* software. These stations are networked into two Novell LAN's, each with a file server and an 80MB disk. Software is stored on the file server. Again, student files are saved on personal diskettes.

The Program's Effect

It is obvious that our students believe the Center is valuable. They levied a fee on themselves to finance a recent purchase of networks. Another proof of the value students perceive is the ever-increasing usage figures for the facility, even though more and more of our students own their own computers.

The results of two early evaluation studies, however, indicate that access to computer text editing and analysis tools does little to improve the quality of Weber State students' writing[*] In both studies instructors taught two section of the beginning composition class, English 101, one with computer support and one without. Writing samples were obtained at the beginning and at the end of the course and were holistically scored. Average scores for computer and non-computer sections in both studies appear below. A total of 169 students participated in both studies.

	Jenson '84						Jenson '87					
	Ins A		Ins B		Ins C		Ins A		Ins B		Ins C	
	C	NC	C	NC	C	NC	C	NC	C	NC	C	NC
pre	6.1	5.6	5.5	3.0	4.4	4.9	7.1	7.0	7.2	6.7	7.0	7.1
post	6.1	5.7	5.2	4.4	5.4	5.0	8.0	7.8	6.7	7.8	7.8	6.9

No consistently superior improvement can be seen among the students who had access to the computer tools, at least when this quality was evaluated at the end of a ten-week period of exposure.

In the second study, students were allowed a second writing session to revise both the before- and after-course essays. The reasoning behind this design is as follows: If computer analysis and editing tools improve revision abilities, then it would be expected that after-course essays revised by computer-oriented students would show greater improvement. Although this difference was noted (for computer students the average revision improvement across the courses was .58, while the non-computer students it was .24), the difference was not statistically significant.

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[*] Jenson, Richard M. and Eric Jacobson. "Effects of Computer-Assisted Writing on Growth of Writing Ability and Attitudes Towards Writing." Northern Rocky Mountain Research Association Conference. Jackson, Wyoming, 1984.

Jenson, Richard M. and Eric Jacobson. "Effects of Computer-Assisted Writing Instruction on First and Second drafts of Pretest and Posttest Essays Written in Selected Computer and Non-Computer Classes." Final Report, Learning Research Services, Weber State College, 1987.

These results may not be as negative as they appear. The lack of improvement may not be because the computer editing and analyzing tools are ineffective, but because they were unused. Jenson pointed to the fact that a single instructor in each study produced sizeable gains in the computer section, the instructor in each case being one who seemed to demand the greatest computer use. That students tend to ignore the computer tools available to them is supported by the study we conducted of questions asked by patrons in our lab. Over 80% of such questions, regardless of the text process used by the student, showed concerns about computer operations and low level page formatting functions. Only 18% of the queries were directed toward text editing or text analysis operations. Before assuming such tools are ineffectual, we need further trials in which such tools are consistently integrated into the curriculum under faculty supervision.

As for the effects of the Computer Writing Center on our faculty, they have been diverse. Although some faculty virtually ignore the Center, enjoying the more carefully edited papers but not participating in direct instruction on the computers, others have devised computer exercises for their students to address invention, development, organization, and style. We are organizing a support group for faculty in all disciplines to encourage production and sharing of such exercises or procedures. With the phasing out of *ALPS*, faculty are turning to *WordPerfect* and *Writer's Workbench* for such help. The Writing Center is also purchasing such software as *Writer's Helper*, with which faculty may experiment and from which they may get ideas.

An important effect on faculty from our WAC program has been the increased communication between various disciplines about what help the Computer Center should provide to writers.

In watching our students at work on their computers, we believe that the effect on their writing, and that of computers on writing in general in our society, will be even more profound than is already apparent. For this season alone, we think it is important to have computers available to our students for word processing. Without training in such systems, our graduates will be woefully unprepared for today's market place. Knowing how to use a word processor marks one as computer literate in an age when such literacy is more and more the divider between those who will and will not succeed in our society.

For computers are not simply a new means of producing the old writing; they are a new medium. Word processing as it is increasingly performed by the everyday person may be as significant an influence on society as was the printing press. We cannot think of computers as simply a new instructional method acquired to teach old writing goals; we have a change now in the medium of instruction. What it took to be a good writer on paper will be somewhat different from what it will take to be a good writer in this new medium. It is important to have computers available for writing on our campus if only to show students that the institution recognizes and supports this new medium.

One irony that occurs to us as we observe the community of writers that has developed in our Center is that a machine commonly perceived as making face-to-face communication less necessary is instead increasing such personal contact.

Our campus is talking about writing more than ever before--not just writing teachers, but administrators, non-English faculty, staff, and students. It is true that the entire country has experienced a renewed interest in writing, but what we are describing here is not the result of any national movement, of changes in textbook pedagogy, of the writing-across-the curriculum drive. It is usually more trivial than that--perhaps one student leaning toward another, asking how to move a sentence--but it seems more deeply influential, because more everyday, more continuous, more personal. Perhaps what we originally saw as a financial constraint is a blessing after all. Perhaps having to share our computer facility with other disciplines--perhaps not being able to buy an individual terminal for each faculty member's office and each student's home or dorm room--has helped create a place on our campus where writing is performed, discussed, and valued.

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WESTERN NEW ENGLAND COLLEGE
SPRINGFIELD, MASSACHUSETTS

A coordinated writing program at a medium-sized private comprehensive college offers composition, composition-through-literature, and composition-with-humanities. The Writing Center, equipped with fifty microcomputers, uses WordPerfect (MacGraw-Hill College Version) for word processing and a locally created text analysis program, SCAN, designed to help students learn systematic revision. In addition to providing essential services to all freshman composition students, the center provides tutorial assistance in language and writing, as well as access to word processing for upperclassmen.

How We Got Started

Western New England College is a private, independent, coeducational college offering a wide spectrum of undergraduate, graduate, and continuing education courses. The College is organized into the Schools of Arts and Sciences, Business, Continuing Education, Engineering, and Law. Of its approximately 5,000 students, 2,100 are traditional full-time undergraduates.

The use of computers in writing classes grew out of joint faculty/administration initiatives: a commitment to writing across the curriculum and a decision that all students fulfill a computer literacy requirement. In designing the required computing course, the faculty discovered that a semester did not allow enough time to teach word processing in addition to other subjects that needed to be covered. Recognizing that computers might be well suited to a composition course, the English Department volunteered to accept responsibility for word processing, thus lessening the demands on the required computing course and garnering whatever benefits computer technology might hold for the teaching of writing.

After a pilot project was concluded, a class-size group of microcomputers was dedicated to the writing effort, with additional machines for uppreclassmen to use after they had been trained as freshmen. The equipment was housed in the Writing Center, which is directed by a full-time professional with a graduate degree in English and postgraduate education in rhetoric and the teaching of writing. The director is assisted by several specially selected and trained students whose responsibilities include tutoring, troubleshooting of minor problems, and clerical duties.

After addressing the issue of space, cost, and equipment selection, we decided to incorporate the computer in every freshman English section. Then, in an attempt to use the computer as more than an electronic typewriter, we designed SCAN a CAI text-analysis program that enables students to assess their writing in terms of coherence, sentence length and variety, paragraph length, transition, spelling, and standard usage.

Because we had selected nonstandard equipment, we experienced more than the predictable problems with hardware as well as with bugs in the software we had designed. In addition, some students felt overwhelmed because they were confronted with not only having to learn college-level writing but also with having to adapt to computer technology without, in many cases, any previously acquired keyboard skills. Consequently, that first semester some instructors felt frustrated because students required more time to produce their first written assignments.

The College underwrote the initial efforts, but in the second year of computer usage we introduced a twenty dollar fee for students enrolled in freshman English courses. The resulting revenues cover the cost of supplies and equipment replacement. By paying the fee as freshmen, students are assured of free word processing for the duration of their enrollment at the College.

Despite the early problems, the combination of computers and composition was generally seen as successful. In addition to the usual benefits of a composition course, students had gained keyboard skills and could manipulate text by inserting, deleting, moving blocks, and using the other functions that word processing performs so well. Although the faculty varied in the degree to which they had used computers in their personal work and in their involvement with the students' use of computers, they agreed that computers had a generally positive effect on the students' writing. Some instructors sensed that a student's success with the writing process increased in proportion to the instructor's collaboration in the act of composition. Those instructors subsequently adapted their teaching styles to include roving the Writing Center to work with students at keyboards rather than waiting in their offices for drafts to be brought to them. Instructors also realized that the computer enabled them to insist on more of what they had always wanted: multiple drafts, extensive revision, and neater appearance.

Our Program

The incorporation of computers into writing courses has enhanced the basic pedagogical orientation of the English faculty. All instructors of composition are committed to teaching writing as a process, with emphasis on practical expository prose; they are also committed to collaborative learning where appropriate. Without computers, many students have traditionally found revision to be boring and time-wasting. Viewed in this manner, revision becomes destructive of the very quality it is meant to foster. Editing and revisions done on a computer, however, are painless and immediate. Moving a block of text is a matter of a few keystrokes, not an entire re-copying; the new technology is thus perfect for students used to instant gratification and for instructors who seek to eliminate the delay between their comments and the students' changes.

The computer is especially well suited for collaborative learning. Students naturally turn to each other for help when they are working on similar assignments in the same place at the same time. Classes can be organized to share papers for peer review and group work because the computer can quickly produce inexpensive multiple drafts.

In the first six semesters of universal computer usage, approximately 2,200 freshmen have encountered the computer in 120 sections taught by 20 faculty members. All students must fulfill a two-semester freshman English requirement, and all freshman English courses require the use of a computer for word processing. In the fall semester about half of the freshmen take a standard composition course, and the other half takes a tutorial-based English course offered in close conjunction with an inter-disciplinary humanities program.

Writing classes use computers in varying degrees and in two fundamentally different ways. In the English tutorials linked to the interdisciplinary humanities program as well as in those courses approaching writing through literature, students prepare assignments in the Writing Center under the guidance of director and staff. Standard composition classes, on the other hand, are scheduled for at least one hour per week in the Writing Center, where classes are conducted as workshops. In either case, students are guaranteed two hours of computer time each week, with more available on standby.

After learning the word processing system, students in humanities tutorials and writing-through-literature courses enter their rough drafts into the computer and obtain printouts on greenbar paper from a high-speed dot matrix printer. Then they can run the *SCAN* text-analysis program on the microcomputer, marking points to be changed on this copy or printing out each step for a more leisurely analysis away from the Writing Center.

In addition to checking spelling and usage errors against master lists, the *SCAN* program performs two additional analyses. A student's paper can be displayed or printed as a list of single sentences aligned on the left margin or with each paragraph truncated to first and last sentence. If students use this program, they make a new greenbar copy for the instructor. The "privilege" of laser copy is reserved for that point of the process at which the instructor has made appropriate comments and the paper has been revised.

The utility of the spelling and usage checks is readily apparent to students from the beginning, but the value of the other two analyses depends entirely on how the instructor employs them. The computer program prints suggestion at the beginning about things to watch for (transition, sentence variety), but offers only a few, rudimentary comments ("Possibly underdeveloped paragraph"). Some instructors make very little direct use of these routines, choosing instead to deal with printouts as with rough drafts prepared in the conventional way. Others try to show students what can be learned by systematically reviewing a paper from each of these perspectives and ask to see the various work products of the *SCAN* program, as well as drafts on greenbar paper exhibiting manual corrections.

Unlike the tutorials and composition-through-literature courses, standard classes meet with their instructor in the Writing Center one day a week, in addition to classroom meetings. In these Writing Center sessions a purposefully contrived "beehive" atmosphere prevails. Initially enticed merely by the promise of word processing, most students begin to look critically at their work and to ask for help from available sources--faculty, Writing Center director, lab assistant, the person in the next seat. Often, as suggestions are offered to one student, another will listen in and then turn to look at the work on his or her own screen. Instructors who meet with their students in workshop sessions have begun to use more collaborative writing techniques. For instance, they may station two students at a screen, allowing them to make changes together, or they may load the same paper into all the machines and ask students to revise and move to other computers, repeating the process until all have worked with several versions of the paper.

Hardware and Software

We are currently correcting our original choice of hardware and software. Initially, we equipped the Writing Center with forty-eight BBC Acorn computers (a British machine with a resident word processing program) interfaced to four high speed dot matrix printers and operational with two laser printers for final copies. We chose the Acorns because of their low cost and the ease with which their word processing system could be learned and used. However, the Acorns were not compatible with the many other microcomputers owned by the College, faculty, and students; their word processor, though easy to learn, proved to be too elementary even for the needs of freshmen; and their small memory made the creation of documents exceeding three or four pages difficult. We are now equipping the Writing Center with MS-DOS machines and with the McGraw-Hill College Version of *WordPerfect* software. This type of hardware and various version of *WordPerfect* are rapidly becoming standards for academic and administrative computing on our campus. Of the Writing Center's forty-eight computers, half are customarily reserved for composition classes and freshmen preparing other assignments; the remainder are for use by upperclassmen.

Response and Findings

Judging from informal evaluations and anecdotal but widespread observations, the marriage of computers and writing has affected both students and instructors in positive ways. Technically-oriented students such as science and engineering majors, who previously may have resisted writing classes, have begun to perceive the writing instructor differently and to have a new respect for writing instruction since it employs a tool they know and respect. Similarly, the use of computers seems to have caused many faculty members from other disciplines to feel closer to the faculty, to become more aware of the role of writing in their classes, and to seek support for class projects form the Writing Center.

Students and instructors have responded to the computer's speed of interaction and implementation. With computer technology, students can and do produce more writing in the course of a semester, though instructors quickly learn that more is not necessarily better. Additionally, instructors generally agree that the computer's ability to assist on the reduction of errors in usage and mechanics frees the teacher to concentrate on style and content, and it enables instructors to insist on correctness and neatness without undue demands on students' time.

The computer enables poor but motivated writers to improve dramatically because they can immediately implement the advice they get and receive praise or further suggestions from the teacher. For better students the distinction between drafts begins to disappear as they come to see their writing as a product that is continually "in process." And for students who are already good writers, the computer becomes not only a wonderful tool but an extension of their consciousness. All of these changes place new demands on writing instructors, many of whom may be reluctant to adapt. However, because of the increased leverage it provides, the computer is also responsible for renewed enthusiasm on the part of some teachers and departments. Both instructors and students generally rate computer-writing instruction higher than that done in the traditional mode.

The computer is not a panacea for writing instructors. Any fear (or hope) that the instructor can be replaced by a computer is ill-founded, for despite its ability to produce amazing results with students of poor and strong preparedness, the computer by itself is not capable of preventing students from being dilatory, sloppy, or pedestrian.

Nevertheless, the computer has changed the conditions under which people write and is changing the manner in which they are taught to write. In fact, it seems to be changing the very nature of what we have come to call the "writing process." Word processing alone improves writing simply by speeding up the revisions process, thus making it more practical and more palatable. When word processing is combined with the kind of text analysis that computer software does so well, students can begin to view their writing in the way an instructor looks at it. We have long known that when an instructor marks every error or place needing discussion in a typical student paper, the result may be a pastiche too dense and tangled for a student to comprehend. Because the computer can provide information in a more systematic way, students can begin to internalize the process of editing and revising.

The computer can also provide a vehicle for reassessing the content of writing courses and the techniques through which they are taught. As departments decide how to incorporate computer technology, they also examine what they teach and how to render it as unambiguous as possible. Those aspects of the writing process which remain mysterious and irreducible thus stand out with even greater clarity, reminders of what it was that intrigued us about good writing in the first place.

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THE UNIVERSITY OF WISCONSIN-OSHKOSH
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This program at The University of Wisconsin's large Oshkosh campus (with 12,000 students) offers computer-assisted instruction in basic writing, freshman composition, and advanced business composition in a computer lab equipped with twenty-five Zenith (IBM compatible) microcomputers with a large (25-inch) video monitor. The program uses Volkswriter 3 and WordPerfect for word processing, and Grammatik for revising. The program also uses locally developed software such as STEP (Prewriting), Diction (Readability), and Scrutiny (Editing). The program is distinctive for incorporating an "apprentice approach" to writing, which, facilitated by the use of computers, emphasizes guided writing with models.

Getting Started

About six years ago, some of us in the English Department at the University of Wisconsin-Oshkosh wanted to use word processing in our composition classes. The English Department did not have any computers of its own; computer labs on campus were mostly used by students of Computer Science, Mathematics, and Business. We asked for a few computers of our own and received two TRS-80 Model III computers form the Math Department. Since most educational programs in writing at that time were available on Apple, we asked for and received one Apple IIe computer. For several years, word processing and other computing activities of the English faculty and composition students were restricted to these three computers. Those who continued their efforts in bringing about computer-assisted instruction in writing included John Brooks, Douglas Flaherty, Stanley Larson, Vincent Lopresti, Anji Roy, Kay Roberts, and Norma Shanebrook. Each tried in his or her own way to introduce computers and writing software to students of various composition courses.

Then in 1985, UW-Oshkosh decided to make its basic writing course (Fundamentals of College English, 38 - 100) completely computer-based. With strong support from Vice-chancellor David Ward and Dean James Hoffman, a fully equipped computer lab for the English Department came into being. I designed the new three-credit course which was taught under my supervision by a lab instructor with the help of several lab assistants or peer tutors.

Available Hardware and Software

Our computer lab has the following hardware configurations:

Zenith Z-151 & Z-148 (25)	Dual disk, 256K RAM Microcomputer, (IBM PC compatible) with monocrome monitor
Panasonic KK-1091 (6)	Dot matrix printers. Four computers are connected to each printer through a T-switch
Zenith	25" Color Monitor (used for demonstration)
Apple IIe (1)	128K with 80 column card and a monochrome monitor. Used primarily for demonstration

Our software includes:

Volkswriter 3	Word processor with a 170,000 word spellcheck program.
Grammatik	Editing program
Thinktank	Outling program
Writing is Thinking	Writing program
Printshop	Graphic Program

Programs at Various Stages of Development at UW-Oshkosh:

STEP (Space, Time, Essence, People)	Invention program
SCH (Sentence Construction Help)	Grammar and sentence combing program.
Scrutiny	Editing program
Unity	Paragraph development
Diction	Readability appraisal applies Gunning's Fog Index)

An Apprentice Approach

In some of our composition courses we have adopted what may be called an apprentice approach. The situation of a student at a university who has to learn writing skills during a semester or two is quite similar to that of an apprentice in a company who has to learn a specific skill within a short time. The person in charge of training an apprentice has to provide him or her with all the necessary theoretical instructions. But perhaps more importantly, the trainer has to provide the apprentices with the required practical training. The trainer has to show the apprentice *how to do something in the proper way.* Much of the learning of the apprentice is acquired through imitation and meticulous following of specific instructions.

Students in these courses are treated as apprentices. Instructors, admittedly, give lectures on composition theories, rhetorical modes, grammatical principles etc., but the practical learning is greatly emphasized. Instructors show the students *how to write effectively* through imitation and meticulous following of specific instructions. Adopting this technique, students learn how to write short essays, memoranda, business letters, proposals, research papers, etc.

These courses include one hour a week of practical session on writing in the computer lab very much like a course in physics or chemistry which requires a laboratory session for conducting experiments in a given area. Like a course in physics or chemistry, these courses emphasize practical applications of theoretical principles. In the computer lab, students are given models to follow. Both good and bad models of writing are presented to them. They are asked to respond appropriately: imitate the good one; rewrite the bad one. With the help of word processing and revising programs, their tasks are made considerably easier.

Computers seem to have proven very effective in translating the "apprentice approach" concept into practice. Using appropriate software the instructor can demonstrate improvements and get immediate feedback from the students. (The process will be faster and more effective with a networking system). Based primarily on the process theory, the apprentice approach is more guided and interactive than inspired individual writing.

Writing Techniques Used in Our Computer Lab

The computer lab of the English Department caters to the needs of a wide variety of students. Those students can be placed in the following categories: 1) students of a fully computer-based course (Foundations of College English) who attend classes in the lab; 2) students of computer-assisted courses (some sections of College English I & II, and Advanced Business Composition) who attend classes in the computer lab for one hour a week; 3) students of other composition courses who come for some exposure to computer-assisted writing; and 4) walk-in students who come on their own to complete their writing assignments.

All these students use a number of computer-assisted programs and techniques. Following Peter Elbow's strategy, students sometimes engage in freewriting or rather compose their ideas uninterruptedly on the computer keyboard during the prewriting stages. Frequently, students resort to invisible writing by shutting off the monitor and freely composing for ten minutes. This technique advocated by Sheridan Blau and Stephen Marcus help students get their ideas on a particular topic on the screen: students refrain from making corrections or revisions until they stop writing and turn on the monitor. *Aristo* and *Tagi* invention programs developed by Hugh Burns are shown on the Apple IIe computer. The instructor tells the students that they are based on Aristotle's rhetorical theory (topoi), Kenneth Burke's dramatistic theory, and Kenneth Pike's Tagmemic theory. Journalistic questions "WHY", "WHEN", "HOW", "WHERE" etc., are created in blinking form on the instruction disk with the aid of the *Volkswriter* word processor. Students then copy the file on their own disks and answer those questions with regard to a given topic. As they answer these questions, they tend to support the initial topic sentence with reasons and facts.

Many students also rely on *STEP*, a locally designed invention program. *STEP* consists of four modules: S pace, T ime, E ssence, & P eople. *STEP* allows students the opportunity of exploring any one or all of these modules to gather ideas on a given topic. For example, if the given topic is "violence", then the space module will suggest ideas relating to violence in physical surroundings, like violence at home, in the neighborhood, in the city, state, country, world, or even in the universe. The space module will offer students a wide spectrum of ideas on violence from "child abuse" at home to "Star Wars in space". In the same way the Time module will place the topic from prehistoric times to the future, focusing also on seasons, festivals, important decades, etc. The Essence module draws attention to the topic as a concept. Essence tries to present the social, economic, political, literary or philosophical implications of the topic at hand. The People module shows the relationship of the topic with all people and living creatures.

After using the idea-generating programs, many students use the outlining program, *Thinktank*. For revision, students use the spellcheck program of *Volkswriter*, *Grammatik*, and locally designed, *Scrutiny*. The summary that *Grammatik* provides at the end includes number of total words, long and short sentences, "be" verbs, prepositions, etc. Looking at the summary alone, the instructor can in some cases make very helpful suggestions. *Scrutiny* focuses on the cliches, jargons, and homonym errors commonly found in freshman themes. The program identifies the errors and suggests replacement words.

A unique collaborative learning approach has been adopted in several composition courses. Derived from the Quality Circle concept in business and industry, in which workers meet in small groups to brainstorm and find solutions to problems as well as to find new ideas for product improvement, our approach draws students together to talk about their writing problems and possible solutions. Our approach is basically similar to Kenneth Bruffee's collaborative learning approach, but it is different in the sense that the circle members have to make a presentation or give a demonstration of what they have learned in group interactions. Students are divided into groups or circles. Each circle has three or four students with specific assignments. For example, if one circle is writing on violence, each member will explore one of the *STEP* modules and copy each other's ideas on their disks and offer suggestions and improvements. When students turn in their themes, they make a team presentation on their interactive learning.

Specific Course-Related Teaching Practices

Some sections of the following courses are now computer-based: Foundations of College English (340 students); College English I (250 students); College English II (150 dents); Advanced Business Composition (350 students).

The basic writing course, Foundations of College English is a highly innovative and completely computer-based course. No formal lecture is given. Each section (with about twenty-four students) meets three hours a week in the computer lab. The lab instructor conducts the class with the help of specially trained student assistants or tutors. The lab instructor teaches the students how to use the computer, the word processor, and other relevant software. Each tutor is assigned to a circle or a group of four students. The tutor acts as a facilitator. The tutor helps the students operate the computer and the software, answers questions, provides interactive dialogues, and maintains a routine that enables the students to complete their tasks on time.

The basic writers use a locally designed software, *SCH*, or *Sentence Construction Help*. *SCH* is at once a grammar and a sentence combining program, consisting of fourteen modules. The first seven modules teach the seven parts of speech (excluding interjection), and the other seven teach sentence combining using corresponding parts of speech. For example, the module corresponding to noun teaches sentences combining using appositives, the module parallel to pronoun teaches sentence combining using relative pronouns, and so on.

The basic writers also use another locally designed program, *Unity*, a simple paragraph development program. Sentences in a given paragraph are numbered and illogically arranged. Students are asked to identify the topic sentence and place it as sentence number one. Some sentences not related to the main idea are often included and students are asked to delete these. The goal of the revision is a unified paragraph.

College English II teaches research techniques, and students are guided to write well-documented research papers. Critical to the course are instruction in the use of computerized card catalogs, instruction to access different databases, and instruction to make online search for documents required for any special research project.

In our Advanced Business Composition courses students engage in various computer-based activities. In particular, students use the *Printshop* program to create company letterheads, and use *Diction* to check the readability level of their written assignments.

Diction is a locally designed program based on Robert Gunning's Fog Index formula. *Diction* counts the total number words used in the assignment, and then counts the number of difficult words, the number of complete thoughts, and finally, using a special formula determines the readability level of the writing. A readability level of 9 or 10 indicates that the writing can be understood by a ninth or tenth grade student. This is considered to be the most acceptable level for business communication. The program recommends upgrading or lowering the readability level depending on the Fog Index. It offers suggestions for replacing certain words in the writing.

Historical Importance

Computer-assisted instruction in composition heralds a new era in writing. For English instructors, it means stepping into the technological age side by side with the colleagues of other departments. English teachers are no longer segregated in ivory towers full of books, papers, pens and pencils. They can be part and parcel of the newest technological advances like desktop publishing, electronic mail, CD ROM, networking, etc. English teachers have an opportunity to enter into a new arena. They can retrain themselves and be as knowledgeable about computers as they can. They may or may not know programming. But they can fruitfully embark on a collaborative venture with computer scientists and others to create new educational software which will make learning easier and more enjoyable.

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